

Sequence	Title	Focus
RLS1	Subitising (including equivalence, more and less)	Subitising numbers up to 5; recognising the amount without counting. Recognising numbers to 5 and linking names to their values
RLS2	Counting Skills (stable order and one to one correspondence)	Counting reliably, using number names in order and one to one correspondence
RLS3	Comparison – Measures	Comparing objects by length, thickness and weight/mass, using appropriate language to describe and order them
RLS4	Pattern Recognition	Noticing, describing and extending patterns, including thinking about what part is the repeating unit
RLS5	Classification	Classifying (grouping) objects using given criteria and their own ideas and comparing the groups after classification
RLS6	Counting the Sort (including cardinality)	Counting a set of items accurately, saying how many are in the set and comparing this to the amount in other sets
RLS7	Using Counting to Compare	Using counting to compare and finding a precise numerical difference in sets of objects in varied contexts
RLS8	Spatial Thinking	Developing spatial thinking and spatial language linked to position and direction, in movements and using symbols
RLS9	Magnitude – Ordering and Estimating	Knowing the position of numbers 0-10 and the relationship to other numbers, such as 0, 5 or 10
RLS10	Regrouping the Whole	Developing a deeper understanding that numbers are made up of other numbers and beginning to rehearse number bonds
RLS11	Regrouping parts to find the total (the whole)	Combining parts to make a whole and using the part, whole model to develop an understanding of addition
RLS12	Finding the whole and missing parts	Explores what to do when something is missing; initially the whole but moving on to working out a missing part. Different types of problems will be used to teach different strategies.
RLS13	Ten and Some More	Understanding values to 20 (focusing on the numbers 10 – 20) by creating the unit of 10, for comparison and finding one more and one less than a number
RLS14	Doubling and Halving	Exploring doubling and halving, including solving problems involving doubling and halving
RLS15	Odd and Even	Understanding that numbers are either odd or even, looking at their 'composition' and whether they share fairly into two groups
RLS16	Counting Beyond 20	Counting beyond 20, recognising the pattern of the counting system, exploring the value of tens and ones in numbers

The Statutory Educational Programme: Mathematics

Developing a strong grounding in number is essential so that all children develop the necessary building blocks to excel mathematically. Children should be able to count confidently, develop a deep understanding of the numbers to 10, the relationships between them and the patterns within those numbers. By providing frequent and varied opportunities to build and apply this understanding - such as using manipulatives, including small pebbles and tens frames for organising counting - children will develop a secure base of knowledge and vocabulary from which mastery of mathematics is built. In addition, it is important that the curriculum includes rich opportunities for children to develop their spatial reasoning skills across all areas of mathematics including shape, space and measures. It is important that children develop positive attitudes and interests in mathematics, look for patterns and relationships, spot connections, 'have a go', talk to adults and peers about what they notice and not be afraid to make mistakes.

Statutory framework for the early years foundation stage - Setting the standards for learning, development and care for children from birth to five – published March 2021

Early Learning Goal (from September 2021)	Sequences in Reception ESSENTIALmaths	
Number ELG: Have a deep understanding of number to 10, including the composition of each number	RLS10	Regrouping the Whole
	RLS11	Regrouping parts to find the total (the whole)
	RLS12	Finding the whole and missing parts
Number ELG: Subitise (recognise quantities without counting) up to 5.	RLS1	Subitising (including equivalence, more and less) Subitising is then reinforced through most future sequences.
Number ELG: Automatically recall (without reference to rhymes, counting or other aides) number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts.	RLS11	Regrouping parts to find the total (the whole)
	RLS12	Finding the whole and missing parts
	RLS14	Doubling and Halving

Early Learning Goal (from September 2021)	Sequences in Reception ESSENTIALmaths	
Numerical Patterns ELG: Verbally count beyond 20, recognising the pattern of the counting system.	RLS2	Counting Skills (stable order and one to one correspondence)
	RLS6	Counting the Sort (including cardinality)
	RLS13	Ten and Some More
	RLS16	Counting Beyond 20
Numerical Patterns ELG: Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as another quantity.	RLS3	Comparison – Measures
	RLS5	Classification
	RLS7	Using Counting to Compare
	RLS8	Spatial thinking
Numerical Patterns ELG: Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally.	RLS9	Magnitude – Ordering and Estimating
	RLS4	Pattern Recognition
	RLS14	Doubling and Halving
	RLS15	Odd and Even

In the majority of cases each learning sequence we have indicated a match to a single Early Learning Goal on the front page. However, that does not mean that other learning sequences will not also support the children's development towards these goals as well. Some learning sequences will not necessarily provide specific evidence for the Early Learning Goal but they are developing concepts, skills and knowledge that are an essential part of the child's journey towards achieving the related goal. RLS8 is such an example where spatial thinking is essential for learning about direction, patterns geometry as well as route finding and mathematical relationships that lead to an understanding of order and comparison.

The learning sequences such as this are essential stepping stones to achieving the linked Early Learning Goal and provides a curriculum that includes rich opportunities for children to develop their spatial reasoning skills across all areas of mathematics including shape, space and measures, as stated in the statutory educational programme for mathematics.

Subitising (including equivalence, more and less)

HfL Learning Outcome
Recognise numbers to 5, linking their names to their value. Subitise (recognise quantities without counting) up to 5.
Early Learning Goal
Subitise (recognise quantities without counting) up to 5
Key Concepts
In this learning sequence, children will learn to recognise the number of objects in a small group and will identify quantities. The ability to recognise a quantity without counting is called subitising. Having recognised values in familiar patterns, children will begin to compare quantities by recognising equivalent and different totals that are not always in familiar patterns. The vocabulary of more, less and equal will be used to describe quantities they can see and compare.
Steps within the Learning Sequence
Step 1: Recognising familiar patterns to subitise, noticing when the patterns are the same and different Step 2: Making the same values in different patterns to subitise Step 3: Noticing when something has a different value when subitising Step 4: Identifying more or less when subitising Step 5: Subitising to identify same, more or less when objects can move

What this learning builds upon
Children are ready for this learning when they: - Recite some number names with a sense of value - Begin to make comparisons between quantities - Use language such as <i>more</i> and <i>lots</i> to describe quantities
What this learning leads to
Recognising small quantities within larger amounts, for example, 5 can be made from a 2 and a 3

Behaviours pupils could demonstrate to show understanding

- Children will have a go at guessing an amount of marks or objects
- Children will be able to instantly recognise and say the correct amount (up to 5) without counting marks or objects
- Children will begin to notice and independently seek familiar arrangement of groups of objects or marks
- Children will find familiar models to copy
- Children will look critically at different arrangements to identify an exact match or whether there is more or less
- Children will identify missing characteristics in an inaccurate replica, for example, if there are too few or too many
- When objects are moved, children remain confident that they can replicate the new model accurately and the value has not changed
- Children will be able to explain the accuracy of the values and arrangements when comparing different sets, for example, if one set contains 3 and the other set contains 4

Ways to check understanding

Children could:

- Match the correct number of objects to a dice or domino pattern e.g. rolling a dice and then putting the same number of buttons in an egg box or cupcake tray.
- Spot the same value in different places in the environment e.g. 4 cars in the car garage or the 4 dots on a dice.
- Recognise the same value in different arrangements and begin to talk about what is the same and what is different.
- Accurately use the words *more*, *less* and *equal/the same* when comparing groups of objects.
- Immerse themselves in using objects and mark making tools to create familiar groupings and meet their own challenges.
- Use their group recognition skills to partition and combine numbers, for example, recognising 3 conkers and counting one more.
- Explain how they identified small amounts.



Step one

Recognising familiar patterns to subitise, noticing when the patterns are the same and different

Provide the following familiar representations of numbers 1 to 6:

- Dotty dice
- Playing cards – Ace to 6
- Numicon® / number frames
- 6 dominoes bricks – blank 1 to blank 6
- Lego® / studded bricks with 1-6 studs



Children pick a familiar representation and using play dough, they either create an impression of the value or copy the arrangement using balls of dough to represent the dots.

How many can you see?

I can see four dots in my play dough from the Lego® brick.

I made four but it looks different. Yours are in a line and mine are in a square.



Do you see four as well?

The two on my dice looks different.



No, my playing card is two.

Yes they both show two but yours is diagonal.

Further opportunities for practice, recall and broadening learning

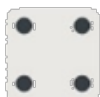
Adults could:

- Have dominoes, dice, playing cards and Numicon® available for the children to explore, subitise amounts and compare.
- Play games, such as snap and dice games that enable pupils to practise spotting familiar representations.
- Set up opportunities in the role play area for children to recognise and match objects arranged in subitisable groups, for example, 3 sick teddies in the hospital.
- Provide equipment for laying the table in role play and notice that the same amount of each item is needed, for example, 4 forks, 4 knives and 4 spoons.
- Point out and model subitising in a wide range of environments using complete sentences. For example, "I can see you have made three muffins in the tin".
- Label bikes/scooters and parking spaces with dot patterns up to 5 for children to match.

Step two

Making the same values in different patterns to subitise

Roll a dotty die and encourage children to say the number rolled without counting the dots.



I have rolled a 4.

Provide children with a selection of natural resources such as conkers, acorns or shells.

Can you make four with the shells?

Four shells.

Well done. You have found 4 shells and put them in the same pattern as four on the dice.

Can you make four in a different way with the shells?

Yes, still four shells.

Encourage the children to make the number rolled on the die as many different ways as possible before rolling the die again. Other resources, such as boxes with sections (egg boxes and chocolate trays) or fives / tens frames, could be provided to help the children rearrange the natural resources into different representations of the number rolled.

When the children rearrange the natural resources, encourage them to subitise the new arrangement. Also, point out that no additional shells, conkers etc. have been added or removed so the total number has been conserved.

Further opportunities for practice, recall and broadening learning

Adults could:

- Play a memory game using cards showing different representations of the same value (handout_RLS1_step2_matching_memory_game). The focus is first to subitise the amount shown on the card and to then find a card showing the matching amount. These both show 2:



- Provide egg boxes, cupcake trays and other examples of regular and irregular representations of number.
- Set up opportunities in the role play area for children to recognise and match objects arranged in different organisations of subitisable groups. For example: 3 baskets piled up in the shop and a bunch of 3 bananas on the fruit and veg stall.
- Add playing cards (Ace to 5) to handout RLS1 step2 memory matching cards and shuffle. Children choose a card and go outside and copy the pattern with natural objects, for example, pebbles or sticks.
- Hide the same amount of coins and jewels in the sand pit for the children to find. Once found, identify that the values are equal and then encourage the children to rearrange the objects and recognise that the values still have not changed.
- Frequently use interactive displays which use different materials to present an amount, up to 6, in a recognisable arrangement

Step three

Noticing when something has a different value when subitising

Provide a role play area that has lots of different sets of objects organised into small groups. For example, a fruit and veg shop with different fruit and veg organised into baskets.

When children are in the role play area, encourage them to say how many of each fruit and veg there are by subitising.

How many pears can you see?



Three.

Are there three of any other fruit or veg?



Yes, there are three bananas.

Once the children have identified how many of each fruit and veg there are and noticed ones with the same value, encourage them to notice those that don't have the same value. Ensure the correct use of vocabulary such as 'more' and 'less'. Children may say bigger and smaller to explain the difference in values but they may be referring to the size rather than the value. If this is the case, children's understanding of conservation of number will need to be nurtured.

There is only one cabbage.



How is that different to the number of bananas?

It's less.

That's right. There are less cabbages because there were three bananas.

Further opportunities for practice, recall and broadening learning

Adults could:

- In Small World, for example, from a selection of zoo animals, children group the same animals together and comment on equal and unequal groups. Encourage the language of same, more and less.
- Use the water and sand trays with small collections of different objects, for example, shells or fish, some with the same amount and some with different amounts.
- Organise equipment around the environment that requires children to find or identify the same small quantities organised into different patterns by subitising, for example labelling pencil pots with a value represented by dots indicating how many need to go in the pot, or foot prints showing how many wellies should be lined up.
- Build three towers of three bricks using varied shapes and sizes (e.g. Lego or wooden bricks) but with the same amount in each tower. The heights will vary so encourage the children to subitise the value and comment on the differences between the towers.

Step four

Identifying more or less when subitising

Provide pupils with groups of objects (between 1 and 6) organised in a way so that the pupils cannot see how many are there. For example, arrange toys in bags - one teddy in a bag, three toy cars in another bag, six shells in another bag etc.

Give the children two bags and tell them that there is a collection of objects in each bag. Show the collections briefly and see if they can say how many objects there are. As they are only going to see the objects for a short time, they will need to subitise the value.



Give further opportunities to compare sets of objects or dot patterns as found on dice, dominoes, and playing cards for example. Children should compare the values and identify whether they are the same, more or less. Vary the size and presentation of the items being compared so that the children know that sets don't always have to be made up of the same things.

Further opportunities for practice, recall and broadening learning

Adults could:

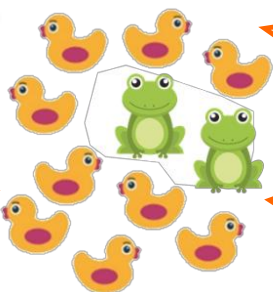
- With two dotty dice, play 'snap': Roll both dice. If they show the same amount, children call 'snap' and say the amount on each. If they show different amounts, decide which is more and which is less.
- Encourage the children to subitise how many rungs are on the ladder on the play equipment. Then compare this to how many stepping stones, for example. Identify if there are more, less or the same.
- Using handout RLS1 step2 memory matching cards play a version of pairs. Turn two cards over at a time and the children will identify same, less or more as fast as they can, pointing to the relevant card(s).
- Using the toy vehicles, arrange them in a car park with three large lorries parked next to each other and five small cars lined up together. Encourage the children to compare, using the language of more or less, and then subitise the values.

Step five

Subitising to identify same, more or less when objects can move

In the water tray, have a larger collection of ducks and one or two frogs.

What do you notice about the amount of ducks and frogs?



I can see two frogs.

There are lots more ducks than frogs.

I can see lots of ducks.

When children are making observations, encourage them to recognise the difference in value rather than counting. Children will not be able to say how many ducks, as there are too many to subitise, but they will recognise that there are more.

Remove some of the ducks so that there are three or less and add another small collection of fish. Ensure that that two groups are equal and one is different.

What do you notice about the amount of fish, ducks and frogs?

There are now three ducks and three frogs.



There are less fish than ducks and frogs.

There is only one fish.

Further opportunities for practice, recall and broadening learning

Adults could:

- Use the water and sand trays with small collections of different objects, for example, shells or fish; some with the same amount and some with different amounts.
- Have two trains on a track, one with two carriages and the other with many more. Whilst the children are driving the trains, encourage them to recognise that one has lots more carriages than the other.
- Have three or four trains on the track with one, two or three carriages. Whilst driving the trains, can the children recognise which engines have the same, more or less amount of carriages by subitising?
- Whilst warming up for PE, playing movement games, ask the children to join together in small groups (in threes for example). Do they recognise when a group is complete or another they could join?

Counting Skills (stable order and one to one correspondence)

HfL Learning Outcome
Count reliably using number names in order and with one to one correspondence
Early Learning Goal
Verbally count beyond 20, recognising the pattern of the counting system
Key Concepts
In this learning sequence, children will learn to use the standard list of number names in order and will reliably count each object only once. This is often referred to as the stable order principle of counting. This sequence will not use numerals (written numbers), in order to focus on establishing a firm understanding of value. By matching counting words to items being counted they will rehearse the correct order of the names without necessarily understanding that the last counting word indicates the amount of the set (the cardinality of the set will be explored in another sequence). This is often referred to as one to one correspondence and is an essential early part of attaching meaning to counting. Some children may show some understanding of cardinality and this should be celebrated. However, the focus of the learning here is to deepen all children's understanding of the stable order principle and the one to one correspondence when using the number names in sequence.
Steps within the Learning Sequence
Step 1: Touching a small set of similar objects (more than one) one at a time and rehearsing the number names in the correct order Step 2: Touching a small set of mixed objects one at a time and rehearsing the number names in the correct order Step 3: Using number names to count a set of objects accurately when they could be moving Step 4: Using number names to count a set of moving objects accurately when they cannot be touched and / or seen

What this learning builds upon
Children are ready for this learning when they: - Identify and compare quantities by rehearsing their subitising skills (RLS1), but are also beginning to gain an awareness of the place of counting in this concept. - Show developing understanding of the value of quantities, gaining confidence in identifying amounts by the number names. - Recognise the importance of the order of number names, indicating a total in a set through the use of counting. - Begin to recite some number names with a sense of value. - Begin to use counting purposefully to try to identify small quantities.
What this learning leads to
- Enabling children to use counting with purpose in order to identify and compare quantities - Developing a sense of number while improving the accuracy of counting skills and confidence with number names through group recognition - Eventually, the children will know that the last number said, when counting a group of objects, indicates the number in that set

Behaviours pupils could demonstrate to show understanding

- Children will consistently recite the number names in the correct order across varied ranges and in different contexts.
- Children will allocate a number name to each item counted only once and in the correct order.
- Children will **not** miss out an item, count an object twice or continue to recite the number sequence beyond the set to be counted.
- Children will recite the counting sequence accurately even if they are unable to touch the items e.g. pictures displayed on the board.
- Children will recite the counting sequence accurately even if they are unable to see or touch the items, e.g. hearing marbles being dropped into a cup and counting the sounds.
- Children **will not** miss out an item, count an object twice or continue to recite the number sequence beyond the set to be counted when counting a small number of sounds or objects which they cannot touch.

Ways to check understanding

Children could:

- Touch and count a variety of static objects in many different group arrangements using the number names accurately. They should recognise when the number sequence stops at the same value for different groupings of the same set of objects.
- Move items into a line as they count to aid accurate counting (to make sure they only count each one once).
- Use one to one correspondence to count accurately items across all zones of provision including some that cannot be moved to form a line.
- Begin to recognise small quantities by subitising and confirm the number name by counting.
- Subitise a small number of objects and continue the counting sequence without returning to one. When they check by using one to one correspondence, counting each object, do they stop at the same number?
- Count objects in a line starting at the third object for example. When the third object is number one in the count, are they still able to count all the objects accurately?

For example, if this is the group to be counted, the children will start here to count 1,2,3,4,5,6,7 but must return to the beginning of the line

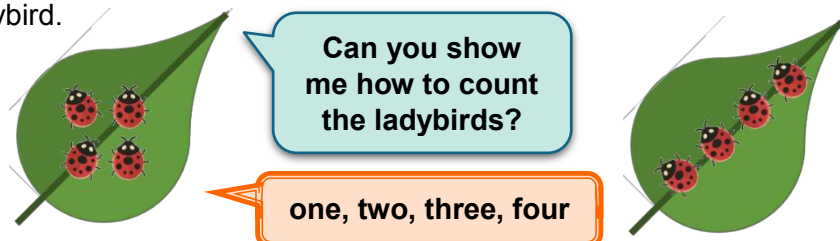


to count the two toys that have not yet been counted.

Step one

Touching a small set of objects (more than one) one at a time and rehearsing the number names in the correct order.

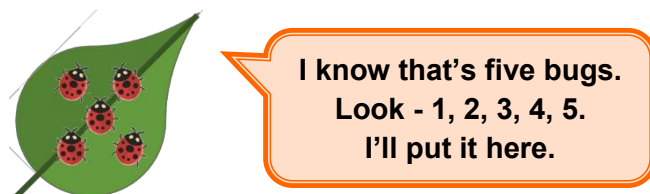
Ask the children to place a number of ladybirds on a leaf and count the bugs. As they count, encourage them to point separately to each ladybird.



Ask the children to compare the leaves with different arrangements and different amounts of ladybirds and use the language more, less or equal when comparing the sets.



Model how to use their subitising skills to find a value and to place it correctly in the sequence of number names helping them to place the leaves in order of increasing values. Ensure all number names are used and that no ladybirds are missed out or counted twice.



Rehearse in many different contexts such as asking the children to count the candles as they place them on each birthday cake and order them.

Further opportunities for practice, recall and broadening learning

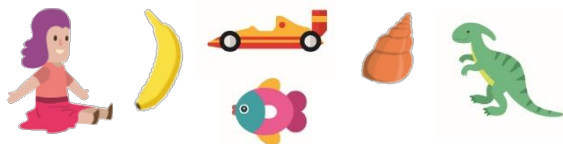
Adults could:

- Offer varied collections of items to be counted within the classroom and outdoor environment.
- Cook with the children to make five birthday cakes and use the sequence of numbers to put the correct number of candles on each cake (1 to 5). Move the position of the candles on each cake without adding or subtracting from them to reinforce the conservation of the number that each cake represents. Change the order of the cakes when the children are not looking and ask them to order them firstly in increasing order (1 to 5) followed by decreasing order (5 to 1).
- At 'tidy up time', ask children to count some of the items as they are being put away. "Can you count the bikes?"
- Count the sets of different fruits in the fruit bowl, touching each piece as they are removed and comparing the sets of bananas and apples for example. Encourage the children to place the fruit in familiar arrangements and subitise to identify a total number of each type of fruit.
- Use tweezers to place one marble in each mould of a muffin tray reciting the number names with confidence. Use the array to subitise the total (using subitising for up to around 6).
- Use play dough to make sets of shapes using different colours and ask the children to identify sets before touching each member of the set and reciting the number names accurately.
- Repeat similar activities in small world, role play, construction, sand, water, outside with natural objects or arts and crafts.
- Use dominoes, dice, playing cards or Numicon® of different sizes for indoor and outdoor use and ask children to match the groupings of the items they are counting.

Step two

Touching a small set of mixed objects, one at a time, and rehearsing the number names in the correct order. Reordering the objects into a familiar pattern in order to make the counting easier.

Repeat the counting of objects as seen in the first step but this time, the objects are varied. Once again, the emphasis is that each object to be counted must be assigned one, and only one, number name. The number name list must be used in a fixed order every time a group of objects is counted.



Challenge pupils to begin the count with a different object each time: "Can you start by counting the fish first?" It is important that the children understand that the order in which the objects are counted does not matter but the order of the number names does matter. The child can start with any object and count them in any order whilst remaining accurate in the order of the number names. Each child will start with a different object. Children might put the objects in a line to aid their counting and ensure accuracy.

Encourage the children to subitise and continue counting the number names in order if they can. Ask the children to gather items from around the room and observe their approaches when you ask them to count the objects. Ask questions to make links in their learning.

Why did you leave those shells like that?

Because that looks like the three dots on my dominoes brick.

I see. So what number comes next?

Four comes after three.

Further opportunities for practice, recall and broadening learning

Adults could:

- Use opportunities when counting the sets of different fruits in the fruit bowl to challenge where the children will begin to count the fruits. They can take the fruit out and put it in a line if this helps their counting. (Let's start at the banana this time).
- Continue to encourage the children to place the fruit in familiar arrangements in order to subitise and continue the sequence in counting wherever possible.
- Change the starting place with the marbles in the muffin mould (from step one) when children are reciting number names with confidence. Use the array to subitise the total.
- Embed the subitising and change of position to start the count again when children work with the play dough to make sets of shapes using different colours. The children should continue to identify sets before touching each member of the set and reciting the number names accurately.
- Repeat similar activities in small world, construction, sand, water, outside with natural objects or arts and crafts modelling the development of subitising and counting to link number names to their positions in the counting order.

Step three

Using number names to count a set of objects accurately when they could be moving.

Provide objects to be counted in the water tray. Bring together the learning from the first learning sequence and the two previous steps to challenge and reinforce the subitising and counting skills the children have been rehearsing. Rehearse subitising to compare amounts (as seen in RLS1) and then ask the children to accurately count the groups of similar objects (fish, frogs and ducks for example) before counting the total amount of objects. Observe the children attempting to touch and arrange the objects in order to count them and remind them of the previous learning.

Those four fish look like the shapes we see on the number four playing card. Do you think that could help?

Yes that's four fish and one, two three frogs.

The adult can bring labelled dot patterns to see if there are any other familiar arrangements before the objects move too much.

Challenge the children again by asking them to start with different objects each time. Do the children understand that once touched, an object cannot be counted again even if it moves?

Similarly, count moving trains on a train track and change the starting carriage each time.



What happens if you start with the first little red wagon?

I think the last number will be the same.

Further opportunities for practice, recall and broadening learning

Adults could:

- Vary the range and the number of toys and objects used in the water tray to challenge the fluency of the children and to rehearse the accurate use of high quality language.
- Vary the representations of familiar dot patterns, such as dice, dominoes and playing cards, to model how these might still be used when ordering number names.
- Model touching and “arranging” objects in familiar ways when they are moving and emphasise the importance of each object only being touched once.
- Use movie images of fish swimming, sheep leaping etc on the IWB and ask children to use their one to one counting to recite the number names accurately. Gradually increase the speed of movement in the examples of moving images.
- During the warm up in P.E., can children count their peers running around the hall?

Step four

Using number names to count a set of moving objects accurately when they cannot be touched and / or seen.

The final step of this sequence is to further compound all the skills that have been rehearsed so far but will also include objects that cannot be seen and / or touched. This requires the skill of visualising the moving objects they can see without being able to touch (or vice versa) but also objects they can neither see nor touch (for example hearing and counting sounds).

Begin by counting objects which cannot be touched. Children place their hands behind their backs and return to the water tray to count boats, balls and other floating items when they are not allowed to touch them.

Where will you start to count?

I'm going to start with the two boats on that side.

OK and what about the balls?

I can see one, two, three, four balls.

The adult models how to count without hands if the child is unable to make a start and may need to recite alongside some children. For other children, the adult may make a “mistake” when counting the moving objects and ask the child for guidance in the correct order of the number names.

Tell the children we are going to try counting items we cannot see. Ask the children to recite the number names in order when counting the amount of coins dropped in a tin held behind the back of an adult. The children are matching one to one by the sounds they hear since they are unable to see the coins or the tin. Children might count together out loud to help themselves keep track. This is sometimes known as a “Barrier Game” where the child is unable to see the model directly.

Further opportunities for practice, recall and broadening learning

Adults could:

- Provide screens as barriers between two children to work in pairs. One child drops marbles into a tin behind the screen without saying anything. The other child counts the marbles in as they drop into the tin. Provide many examples of loud items such as these to be counted without being able to see them.
- Set up a water tray or small paddling pool with items such as ducks or balls for the children to count as they move slightly floating around.
- Ask the children to count the ducks, geese or swans, for example, during a nature walk if there is a lake nearby.
- Ask the children to carry out a short tally of vehicles that pass by the school.
- Provide a mixed audio resource of everyday sounds and ask the children to listen and count the sounds they hear. At first, the children will count out loud but will be asked to count silently when they are ready.

Comparison – Measures

HfL Learning Outcome
Compare objects by length, thickness and weight/mass, using appropriate language to describe and order them.
Early Learning Goal
Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity
Key Concepts
In this learning sequence, children will learn to compare using language for length, thickness and weight, moving on from the more general language of big/bigger and small/smaller. The vocabulary of bigger and smaller will be added to with longer/taller, shorter, wider/fatter, thinner, heavier and lighter. The use of this language will be modelled and encouraged within appropriate contexts such as making play dough worms or building towers. Having recognised that items can be compared by an attribute such as length or weight, children should be encouraged to use a full sentence to explain what they think or have found out. Children will also have the opportunity to order a small set of objects.

Steps within the Learning Sequence
Step 1: What makes objects similar and different: Explaining what we notice Step 2: Using the language of longer/taller and shorter to compare length or height Step 3: Using the language of wider/fatter/thicker and thinner to compare thickness Step 4: Using the language of heavier and lighter to compare mass/weight. Exploring that bigger things might not be heavier Step 5: Ordering a small set of objects by a given attribute

What this learning builds upon
Children are ready for this learning when they: Describe and compare objects as big / bigger or small / smaller.
What this learning leads to
- Beginning to devise their own ways of measuring and comparing objects such as measuring using cubes as a unit of measure. - Using a tape measure or pan balance and cubes to say how long or heavy an object is (without any formal metric units required).

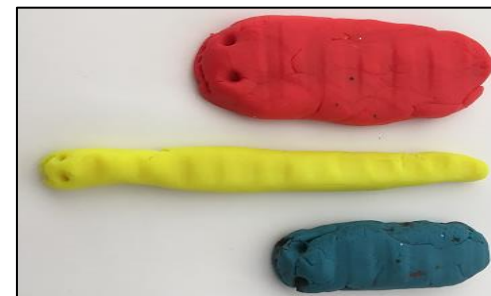
Behaviours pupils could demonstrate to show understanding

- Children will be able to describe and compare objects or pictures, using language of bigger, smaller, longer/taller, shorter, wider/fatter/thicker, thinner, heavier and lighter.
- Children will notice when something is longer/taller or shorter than something else, for example they might compare their height to a friend and say who is taller.
- When working with materials such as playdough or building blocks, they will be able to say which playdough worm/sausage is longer or fatter out of a pair or small number of them.
- Children will be able to use a pan balance or way of comparing the weight of two objects, knowing that the heavier side (object) ends up lower down.
- Children may choose to order items by size, for example, if given three bears and three bowls to act out the Goldilocks story, they might give the smaller bowl to the smallest bear.

Ways to check understanding

Children could:

- Say which object is longer/taller or shorter out of a pair or small number.
- Say which object is thicker/fatter or thinner out of a pair or small number.
- Say which object is heavier or lighter out of a pair.
- Order a small number of items, for example by length.
- Use equipment, such as a pan balance, with support, to compare objects.



Step one

What makes objects similar and different: Explaining what we notice.

Offer some real objects and/or images of objects which engage the children and ask them to describe, compare and discuss:

What do you notice about the bear and the ball?



They are both toys.

They both begin with 'b'.

One is brown and one isn't.

The ball is round and smooth. The bear is soft.

Help children to express their ideas about what is the same and what is different. Encourage sentence structures such as:

They are both _____. / They both have _____.

The ____ has / is ____ but the ____ doesn't / isn't.

For this first step, there is no rush to lead the language towards length or weight comparisons as these are explored in future steps. Children can lead the language, choosing their own attributes to compare, such as colour or texture.

Further opportunities for practice, recall, broadening and deepening learning

Adults could:

- Provide interesting objects for the children to talk about such as a collection of shells (of different shapes, sizes and colours), pirate treasure (gems of different colours or sizes and coins).
- Provide playdough and/or construction materials for children to make and build with and encourage children to explain what they notice about theirs and others' constructions.
- Provide a small range of fruit at snack time that could be compared if the children choose to talk about it.
- Use the role play area theme to continue exploring similarities and differences, for example, in the food orders if it is a café role play.
- Provide equipment for laying the table in role play that is not all from the same set, for example, different sizes of cups, plates and cutlery.
- Begin conversations that allow children to compare similarities and differences such as pets.
- Play games such as 'stand up, sit down'. All of the children sit together and the game leader gives statements such as "stand up if you're wearing a cardigan" or "stand up if you have Velcro on your shoes". Notice who has the same features.

Step two

Using the language of longer/taller and shorter to compare length or height

Begin with two towers made of Lego® or something similar (so that they can be held and stay together). One should be longer/taller. Show them both vertically (so one is taller), and horizontally (so one is longer). Confirm the language of longer/taller and shorter.



What do you notice about the two towers?
What about when we hold them this way round?

That one is taller because it goes up higher.
Now it is longer.

Ask two children to stand next to each other and compare their heights. Talk about 'taller' for when things are vertical.

Explore making worms out of playdough and use 'longer' and 'shorter' to compare their lengths.

The children could go on to measure their worms of playdough by making towers of cubes the same length.

My worm is longer. It is 6 cubes long. His worm is 4 cubes

Further opportunities for practice, recall, broadening and deepening learning

Adults could:

- Provide a range of natural materials for children to compare and order.
- Provide a range of construction materials for building towers and structures so that children can explore what makes a tall tower or structure.
- Provide cubes, Duplo or Lego (construction materials which fix together) so that the towers can be vertical and horizontal. Model the correct language of longer and taller in these situations.
- Provide playdough and other malleable materials which can be shaped and stretched (such as clay) for children to create shapes with to compare and order.
- Provide creative and collage materials (such as ribbons, pipe cleaners, string) for children to create collage art work and discuss how they used longer and shorter pieces of material within the work.
- Provide ways to 'measure' what they are making or comparing, such as small cubes, measuring tapes, strips of paper (with or without numbers marked on).
- Use story opportunities such as Jack and the Beanstalk (to talk about the height of the beanstalk as it grows) and Goldilocks and the Three Bears (to talk about the size of the chairs/beds).

Step three

Using the language of wider/fatter/thicker and thinner to compare thickness

Show two 'worms' made of playdough or clay. One should be thicker/fatter and the other thinner but they should be roughly the same length.



What could we say about these two worms?

The red one is thinner.
It's not as fat as the green one.

Children could then make their own worm and compare it to a friend's one, using the language. "My worm is ____ than Henry's."

Explore thinner and thicker/wider/fatter to discuss other things around the classroom and outside area such as sticks or towers of bricks.

Challenge children to make food items from playdough where thinner and thicker/fatter/wider might be appropriate ways to compare them; sausages, chips, carrots, pizza bases etc.

Further opportunities for practice, recall, broadening and deepening learning

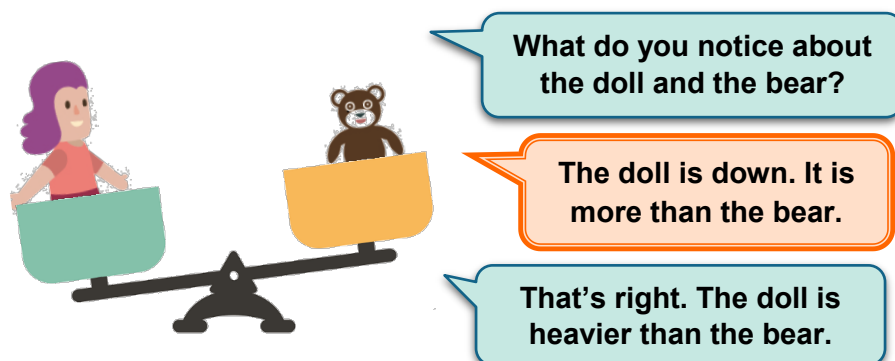
Adults could:

- Provide a range of natural materials for children to compare in terms of thickness.
- Provide a range of construction materials for building towers and structures so that children can explore what makes a structure wider (and extending this to discussing wider tower bases being more stable).
- Provide cubes, Duplo or Lego (construction materials which fix together) and explore how to make these models wider/fatter or thinner.
- Provide playdough and other malleable materials which can be shaped and stretched (such as clay) for children to create shapes to compare and order.
- Provide creative and collage materials (such as ribbons, pipe cleaners, string, felt, card and paper) for children to create collage art work and discuss how they chose materials according to their properties.
- Offer a range of dressing up clothes and explore the fabrics they are made of. Explore whether the thicker materials are warmer.

Step four

Using the language of heavier and lighter to compare mass or weight. Exploring that bigger things might not be heavier.

Show children pan balance scales with an object on each side where one object is clearly heavier than the other.



Confirm that the lower side means the heavier side. So the doll is heavier than the bear. The bear is lighter than the doll.

Ask children what they would like to compare from a selection of objects (a ball, a blown up balloon, a wooden block). Can they guess which might be heavier/lighter out of a pair? Give children the objects to feel to see if they can predict which will be heavier or lighter. At this point, notice that bigger objects (like the balloon) might not always be heavier. Test them on the pan balance.

If children seem ready, introduce a way of measuring such as using cubes. Model how many cubes would balance with the doll and then how many cubes would balance with the bear. Did it take more cubes to balance the doll? This is another way to show it is heavier.

Further opportunities for practice, recall, broadening and deepening learning

Adults could:

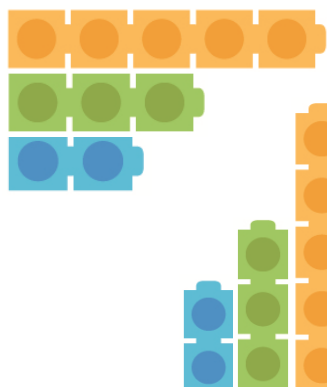
- Provide pan balances as part of an interactive display along with a range of objects. Give simple questions to help children compare, for example, 'Which is heavier?' Use interesting objects to compare the weights of, for example, 'Which is heavier; an apple or a banana?'
- Provide cubes alongside the pan balances to offer both types of weighing (by comparing two objects directly to see which is heavier or by using cubes to see how many cubes an item weighs).
- Extend the options for weighing from cubes to buttons or other smaller items of which there are lots. For example, 'How many buttons does the toy car weigh?'
- Set up play cooking activities with scales (normal kitchen scales and pan balances) and toy food or playdough.
- Offer real cooking opportunities which involve some weighing and measuring.

Step five

Ordering a small set of objects by a given attribute

Offer a set of three items such as 3 buttons, 3 playdough worms, or 3 Lego® towers. Explore how they could be ordered, for example, by length or height, by thickness or by weight.

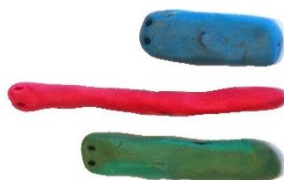
Allow the pupils to explore how they would like to order the 3 items and discuss their choice and order.



**The blue tower is shortest.
The green tower is in the middle.
The yellow tower is longest. It is 5 cubes long.**

**Now, if we stand them up,
the yellow tower is tallest.**

Explore sets that could be ordered in different ways, e.g. the order of the worms pictured would depend on whether they were ordered by length or thickness.



Remind children of the range of language they can now use to describe and compare objects.



The banana is longer and thinner than the apple.

Further opportunities for practice, recall, broadening and deepening learning

Adults could:

- Provide a range of natural materials for children to compare in different ways, such as length or thickness.
- Provide a range of construction materials for building towers and structures so that children can explore what makes a structure wider or taller.
- Provide cubes, Duplo or Lego (construction materials which fix together) and explore how to make these models wider/fatter or thinner and longer or shorter.
- Provide playdough and other malleable materials which can be shaped and stretched (such as clay) for children to create shapes to compare and order.
- Provide creative and collage materials (such as ribbons, pipe cleaners, string, felt, card and paper) for children to create collage art work and discuss how they chose materials according to their properties.
- Offer a range of dressing up clothes and explore the fabrics they are made of in terms of thickness and how they fit in terms of length, for example, comparing super hero cape lengths.
- Look at pictures of a range of animals and discuss their different attributes such as length of tail or neck and how long or tall they are. Offer small sets of toy animals that could be compared and ordered in different ways.

Pattern Recognition

HfL Learning Outcome

Notice, describe and extend patterns. In repeating patterns, they think about what part is repeated.

Early Learning Goal

Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally.

Key Concepts

In the early years, it is crucial that we provide many opportunities for children to explore and identify the regularities, sequencing and repetition that characterise pattern in mathematics. By recognising pattern, children are beginning to recognise mathematical relationships and algebraic structures that will deepen their mathematical understanding.

In this sequence, children will begin to understand the elements of pattern that can be found in the world around them as a precursor to the exploration of numbers that will be the focus of another sequence later in the year. This will build up their vocabulary to explain and describe patterns as they are beginning to generalise, make predictions and draw conclusions from a breadth of experiences.

The children will begin to recognise the crucial “unit of repetition” in varied patterns (the beginning of multiplicative reasoning) as having a value in itself whilst being a part of a whole. It is at this point that they will be able to create patterns of varying complexity independently and with confidence.

It is important that the children record their patterns in order to begin to symbolise the structures of varied sequences in many contexts.

Steps within the Learning Sequence

Step 1: Comparing patterns – what’s the same/different?
 Step 2: Continuing a pattern with a given unit of repeat
 Step 3: Identifying the unit of repeat and describing in many contexts.
 Step 4: Creating varied patterns and independently deciding upon the unit of repeat

What this learning builds upon

Children are ready for this learning when they:

- Begin to understand order, for example, lining up objects (putting the dinosaurs into a line when playing with them)
- Spot similarities and make groups, for example, by colour, shape or type (e.g. selecting the *red* cars)
- Begin to spot patterns, for example, with two colours or shapes that repeat (noticing circle, square, circle, square...)
- Begin to create patterns within their play

What this learning leads to

- Spotting the smallest repeated part of the pattern and describing it, for example, “this pattern always has a yellow triangle followed by a blue square and green circle.” Showing they can identify rules and order. This is the beginnings of algebra.
- Spotting more complex patterns in the environment and nature
- Beginning to spot patterns within number such as what happens when you add one more
- Beginning to spot patterns within number bonds such as $10+0$, $9+1$, $8+2$... all equal to 10

Behaviours pupils could demonstrate to show understanding

- Children will show interest and curiosity, sometimes seeking pattern all around them.
- Children will make decisions about what to use to complete and extend the pattern accurately.
- Children will talk about and describe the key features of patterns they come across.
- Children will respond appropriately to questions and with accurate detail using language associated with pattern.
- Children are willing to have a go at extending a pattern starter, changing strategy where appropriate so that key features/characteristics are repeated accurately.
- Children will show sustained engagement in completing patterns using their own ideas and self-selected materials.
- Children will learn to identify the “unit of repeat” within many varied patterns, confident that they could extend the pattern infinitely.
- Children will reason the choices they have made and explain their thinking in the pattern they have created.
- Children will show satisfaction at meeting their own goals and are proud of their achievements.

Ways to check understanding

Children could:

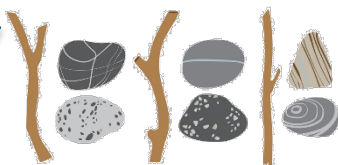
- Identify individual components in a pattern sequence and then the “unit of repetition” for the same sequence? In red, blue, green, red, blue, green, red... what is the smallest repeated part?
- Use their positional language (e.g. next to, in between, before, after and ordinal numbers) in their descriptions of patterns
- Spot patterns in nature or around the environment that they can describe
- Design a sequence of movements in P.E. with a partner that has a pattern (jump, step, hop, step, jump, step, hop, step) and consider the “unit of repetition”
- Create and perform musical patterns with their voices and/or with instruments
- Explain what is wrong and correct it when presented with a simple pattern that includes a deliberate error

Step one

Comparing patterns – what's the same/different?

Provide opportunities for children to extend a pattern from many varied starters in all zones of provision, including the use of manmade and natural materials; music, movement, stories, art and play. Reinforce the accurate use of language to describe the key features of the patterns they are making.

Tell me about the pattern you have made.



After each stick, there are 2 stones.

So how does that help us here?



Look, one red counter, two yellow ones and then repeat.

Ensure that the children are able to make links between the patterns they can see using varied resources and those that can be found in shape, colour and numerical patterns. These mathematical models will scaffold the links in the learning.

Provide photos of “patterns” that can be seen in the learning environment and others from the outside world. For example, provide samples of wallpaper, borders etc. and ask specific questions that will encourage children to use previously learned language accurately.

How many different objects/shapes/colours can you see in this pattern? Tell me about the third one.

Point to items in the sequence that are not at the beginning of the pattern and ask the children to continue the sequence accurately.

Further opportunities for practice, recall, broadening and deepening learning

Adults could:

- Rephrase children's comments in order to emphasise the elements of pattern and use key words such as 'again', 'the same' and 'repeated'.
- Use effective questioning to challenge children's thinking about what they know and understand about pattern.
- Model language to further develop children's understanding of the characteristics of pattern beyond what they already know.
- Draw children's attention to repeated events in the daily routine.
- Draw children's attention to repeated pattern in the natural environment.
- Provide a commentary alongside varied activities to model talk about pattern and display thought processes that are appropriate to the context.
- Help children to recognise rhythm and pattern in the syllables of their name and other nouns.
- Point out patterns to be seen in the environment and talk about the repetition.
- Plan ways that invite children to make patterns for a purpose, e.g. a dance sequence for performance.
- Work alongside the children when they are creating patterns and talk about the decisions they are making.
- Encourage children to reflect upon patterns they have made and talk about them.

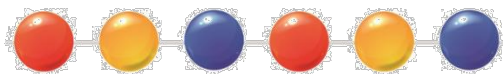
Step two

Continuing a pattern with a given unit of repeat

Work alongside the children to create necklaces, belts and bracelets using coloured beads, encouraging the vocabulary for position and order in a running narrative. Click beads help to focus on the pattern making rather than the fine motor skills.

Tell me why you want a yellow one next Luke.

So what colour will the fifth bead be?

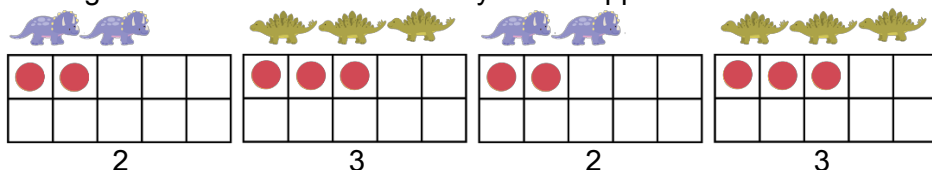


I need the yellow bead to go in between the red and the blue ones.

Ensure that more than 2 colours and several shapes are used in varied examples and provide examples of different lengths of units of repetition. Many children will struggle beyond ABABAB or ABCABC patterns so adjust the complexity of the pattern according to the learners but insist upon the highest quality of language to continue to describe the features. Leave some samples you have started and ask the children to complete the necklaces, belts and bracelets. Observe their choices and listen to their speech in a group.

Another opportunity to continue a pattern can be found by printing (manmade stamps, vegetable printing etc.) and asking children to finish each other's creations by finding and repeating the patterns.

Ensure that the provision mapping includes opportunities to continue patterns in all zones and several times throughout the year. These should then be used to compare to number sequences and patterns, making links for the children that may not be apparent.



Further opportunities for practice, recall, broadening and deepening learning

Adults could:

- Model action songs and rhymes that require repeated actions and words in response from the children. Then stop and ask the children to continue.
- Provide regular opportunities to sing repetitive songs and rhymes where the children sing the repetitive phrase/words without you.
- Use photographs, models etc as examples of a pattern to be repeated in all zones. For example, mark a pattern on clay and leave it as a model for the children to follow.
- Ensure that the models provided as a pattern starter are varied and include a progression of increasingly complex features and lengths in the initial sequences.
- Continue to offer other examples of circular patterns as seen in the necklaces, for example, in outdoor learning.

Step three

Identifying the unit of repeat and describing in many contexts

Build a tower as an example of a vertical pattern, for example, with coloured or different sized construction bricks. Stop part the way through a unit of repeat to see whether the children can continue it. When they are ready, ensure that the children are given several opportunities to recognise ABB, ABBC patterns etc. and insist upon accurate language to describe them, including the rehearsal of ordinal numbers.



Tell me about the eighth brick in the tower.

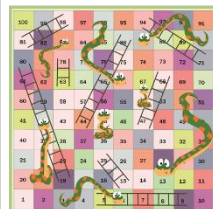
Ensure that further variety is provided by resource and by configuration, including circular patterns and grid-like patterns that can be seen in wallpapers and fabrics for example. Insist upon the language of repetition this time such as again, repeat, copied etc.



See if you can find where the pattern begins and where it ends.

Count the repeats and show me them.

Ask the children to cut out one length of the unit of repeat from a sample of border and then increasingly complex wallpaper samples. Play board games with the children and identify the patterns to be found on the board. For example:



**Can you see any patterns here?
Show me the unit of repeat using the pattern blocks?**

Further opportunities for practice, recall, broadening and deepening learning

Adults could:

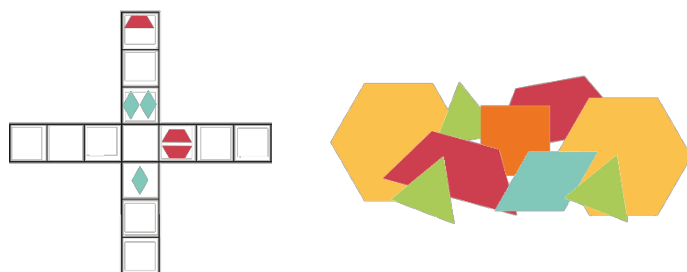
- Regular opportunities to sing repetitive songs and rhymes, pointing out the unit of repetition.
- Action songs and rhymes that require repeated actions and words in response from the children.
- Read stories with repeated refrains and use conjecture to encourage children to join in with familiar phrases.
- Promote discussion using images of pattern, including photographs, artwork, wallpaper, wrapping paper, fabric, patterned clothes for dolls/role play.
- Arrange familiar objects such as leaves and stones in a train of pattern and rearrange them regularly to identify the new “unit of repetition”.
- Take opportunities to recognise and describe patterns in changing areas of the environments using a range of regularly changing natural and manmade materials.
- Ensure that all children are exposed to pattern by colour, texture, sound, size or shape and sometimes more than one attribute (e.g. hard blue ball, small soft teddy, tall red tower etc).
- Take every opportunity to use ordinal numbers in the context of identifying and explaining the unit of repeat.
- Create opportunities for children to see, continue and describe many varied representations, including spiral, wriggly, diagonal examples of repeated patterns before ensuring they are exposed to the infinity of a circular pattern, such as arranging fruit around the rim of a plate in an ABAC pattern.

Step four

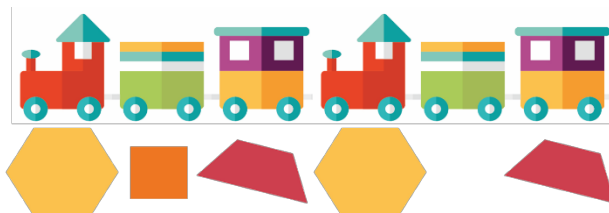
Creating varied patterns and independently deciding upon the unit of repeat.

This step should feel like a natural flow from the previous step and will largely involve adults as observers and prompting the learning towards greater complexity.

These opportunities will include growing patterns such as “staircase” patterns or extending the spokes of a star or cross pattern.



There should be many opportunities for independent creativity in all zones of the environment. In each of these cases, children will be asked to record their work flexibly. Children should be encouraged to represent objects (such as pebbles, dinosaurs, pieces of fruit) as symbols using colour and shape to identify a unique symbol for each term of the pattern sequence.



**What's missing?
Bring me the
train carriage
this represents.**

Further opportunities for practice, recall, broadening and deepening learning

Adults could:

- Provide opportunities for children to create patterns for themselves using mixed media and to “symbolise” the sequence in their independent recordings.
- Include opportunities for children to create patterns for the purpose of design – a wrapping paper for a birthday or a design for a dinner service for example.
- Adults could ask the children to use their recorded, symbolic sequence as instructions for another child or an adult to follow using real objects.
- Present deliberate errors using familiar resources and ask the children to “fix” the problem by recording the sequence accurately using symbols rather than the resources.
- Ask children to use their own code to describe a pattern orally to a partner who cannot see the recorded sequence but will create that pattern using real objects.
- Provide opportunities for children to represent their learning diagrammatically as often as possible, before exploring an independent recording of a familiar story or rhyme as a growing pattern such as the “Hungry Caterpillar” by Eric Carle. Do include examples of reduction too, such as five little speckled frogs or ten fat sausages sizzling in the pan. Once again, there should be opportunities for the children to symbolise the characters in the stories and rhymes rather than literally drawing the frogs, for example.

Classification

HfL Learning Outcome
Compare and classify objects using given criteria and own ideas. Compare the amount within groups after classification.
Early Learning Goal
Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity
Key Concepts
In this sequence, children develop their precision of language to describe the attributes of sets of objects. The children will use given attributes and their own ideas to classify sets of objects into groups. Initially, the attributes to sort the set will be provided and then the children will create the sort. Children will then re-sort the same set of objects to a different set of attributes. The learning moves onto recognising that within a set, the objects may have multiple attributes and this can be used to create intersections within the sort, such as the overlap within a Venn diagram. Finally, the size of the groups within a sort will be compared using the language of more, less and equal. When the size of the set is small, the value could be identified by subitising, reinforcing the learning from Sequence 1.

Steps within the Learning Sequence
Step 1: Identify objects that could be added to a set using given criteria Step 2: Identify an attribute that enables a collection to be classified and then sort into those that belong and those that don't Step 3: Identify an attribute that enables a collection to be classified into multiple groups Step 4: Create sets where some objects don't meet any criteria and some create an intersection by meeting both Step 5: Compare the groups after being classified

What this learning builds upon
Children are ready for this learning when they: • Begin to create groups within their play, for example, collecting all the bears • Are able to see what goes with a particular set or type when tidying up, for example, the wooden bricks go in this box and the train track goes in that box
What this learning leads to
• Sorting and classifying objects in increasingly complex ways, including using own ideas • Sorting using mathematical criteria, for example odd and even numbers.

Behaviours children could demonstrate to show understanding

- Children will identify the set objects belong to by recognising a given attribute
- Children will be able to identify attributes by which a group of objects could be classified and explain their choices
- Children will make decisions about what criteria to use to complete and extend a set
- Children will give reasons and describe the attributes of a set – both physical and non-physical
- Children will independently find more things to go in a given set, both with single criteria and intersections of two criteria
- Children will reason about the choices they have made and explain their thinking in the sets they have created
- Children will recognise, when comparing two or more sets, which set has more, less or when they are equal
- Children will subitise small numbers of objects in a set, stating how many are in the group

Ways to check understanding

Children could:

- Add a further couple of objects to groups which have already been sorted, for example buttons and counters, noticing the difference between them.
- Sort items into groups where there is an overlap, for example vehicles with 4 wheels and vehicles that are red.
- Notice which vehicles don't belong in either group or those which belong in both.
- Suggest their own way to classify a large group into smaller sets, for example when given a range of zoo animals, how they could be organised, e.g. different numbers of legs, some with wings and some that live in water.
- Say whether there are more of one type or another after items have been classified and go on to explain whether they needed to count them or they 'just knew' by subitising.

Step one

Identify objects that could be added to a set using given criteria

Reception classrooms are organised places, most areas are clearly labelled and every day, children are asked to put things away in the correct place. This is classifying.

Provide the children with a collection of items that need to be sorted, for example, a selection of junk modelling equipment.

Have some discussion about what is the same and different about the boxes, bottles etc. recapping the comparison learning from Sequence 3. Provide the children with two labelled containers to sort the junk modelling equipment: boxes and not boxes. Sort the materials.



What do you notice about the stuff in the 'not boxes' container?

There are lots of different things like plastic bottles, lollipop sticks and tubes.

What do you think we could do to sort it better?

We could have more than two containers to put the stuff in.

Provide the children with more labelled containers and continue to sort the materials into multiple groups.

Further opportunities for practice, recall, broadening and deepening learning

Adults could:

- Notice that the fruit at snack time could either be all in one bowl or could be sorted by type. How many bowls would be needed if each bowl had a different type of snack?
- Have environments around the provision that enable children to tidy away independently by sorting objects into the correct places.
- Have clearly labelled places for items. Notice and point out when things end up in the wrong place, for example "there's some Lego in the wooden bricks box. Can anyone help me sort this out?" "There is a pencil in the scissors pot. Where should it go?"
- In small world, provide opportunities to sort things into areas, for example: a dolls house and furniture
- In the role play area, provide things that could be classified, for example the cutlery (into knives, forks and spoons), the toy food (into different food groups of the children's choice), money in the till (into different coin denominations).

Step two

Identify an attribute that enables a collection to be classified and then sort into those that do and those that don't

In the previous step, the criteria for sorting the collection was given. In this step, children will need to use their skills of comparing to identify something that enables a collection to be classified; initially into two groups.

Provide a collection, for example toy dinosaurs. Identify a feature that a selection of dinosaurs have.



Some have spiky bits.

Yes they do. We could put all of those together in one group. What would we label the rest of the dinosaurs?

Clarify that when creating two sets, one set will have the attribute and the other will not.

No spiky bits.

Ask the children for a different attribute for the dinosaurs and create another two sets, where one does have the attribute and the other doesn't. For example: meat eater / not meat eater; walks on four legs / doesn't walk on four legs.

Further opportunities for practice, recall, broadening and deepening learning

Adults could:

- Have a range of vehicles available for the children to classify and ask how they plan to group them. Make the range as broad as possible including, for example, aeroplanes and/or boats and well as cars, lorries and trains, to give genuine choice about the way they are grouped
- In small world, provide opportunities to sort things into areas, for example: a dolls house and furniture
- In the role play area, provide things that could be classified, for example the cutlery (into knives, forks and spoons), the toy food (into different food groups of the children's choice), money in the till (into different coin denominations).

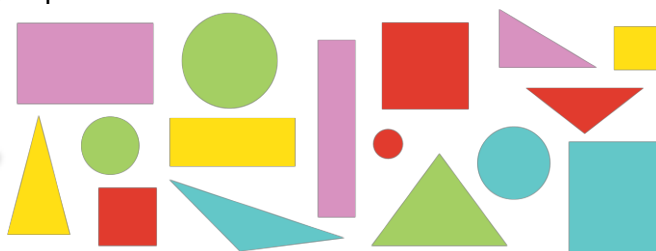
Step three

Identify an attribute that enables a collection to be classified into multiple groups

Provide children with a collection of objects that could be sorted in different ways, for example by their colour, their name or their purpose so there are multiple groups.

The collection could be shapes.

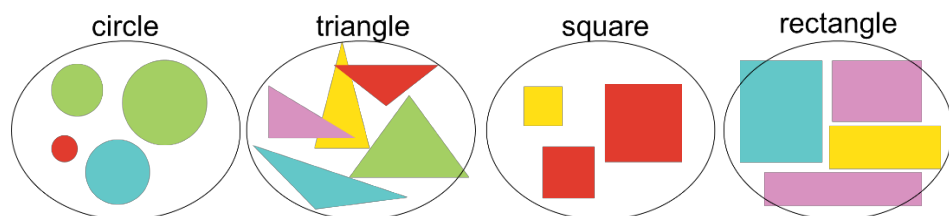
What do you notice about the collection of shapes?



They are different colours.

Triangles, circles, squares.

Clarify that the group could be organised into a set that is something and a set that is not e.g. red shapes and not red shapes but it can also be organised into multiple sets giving each set a label. For example:



The children could re-sort the group using another attribute they noticed, for example: by colour - red, green, yellow, purple and blue.

Further opportunities for practice, recall, broadening and deepening learning

Adults could:

- Provide a large collection of animals or dinosaurs for the children to explore and classify in multiple ways.
- Have a range of vehicles available for the children to classify and ask how they plan to group them. Make the range as broad as possible including, for example, aeroplanes and/or boats and well as cars, lorries and trains to give genuine choice about the way they are grouped.
- Have images of a range of fairy tale characters which could be sorted into multiple groups.

Step four

Create sets where some objects don't meet any criteria and some create an intersection by meeting both

As in the previous sets, the children will need to have a set of objects that can be sorted by a variety of attributes. In the previous steps, all the objects have fitted into a set due to the has/has not nature of the sort or having multiple groups. Here, there are two criteria which not all the objects will meet and some will meet both; causing an intersection.

Give the children a selection of shells. Notice that some of the shells have similarities, for example, some are spiral. Pick another attribute, for example, stripy patterns on the shells.

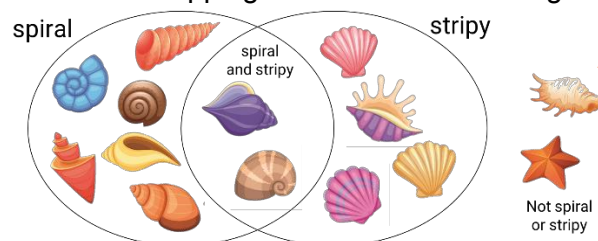


Some of the shells are not stripy or spiral.

Can you sort these shells into two groups; one group of spiral shells and one group of stripy shells?

Some of the shells are both.

Create overlapping sets and model sorting the shells.



I can see that some shells are both spiral and stripy. They go in the middle.

Further opportunities for practice, recall, broadening and deepening learning

Adults could:

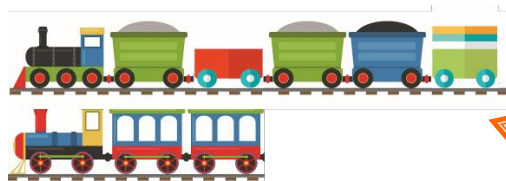
- Provide a large collection of animals or dinosaurs for the children to explore and classify in multiple ways.
- Have a range of vehicles available for the children to classify and ask how they plan to group them. Make the range as broad as possible including, for example, aeroplanes and/or boats and well as cars, lorries and trains to give genuine choice about the way they are grouped.
- Have images of a range of fairy tale characters which could be sorted into multiple groups.

Step five

Compare the groups after being classified

Classification enables children to know what to count so providing children with lots of different opportunities to do this is important. Once the children are confident in identifying how and why a collection is sorted, they can then begin to compare the value of the sets using the vocabulary of more, less or the same / equal. When there are small quantities in the set, they can subitise the amounts to compare.

This could be whilst building trainsets in the small world. The children could classify the carriages into those that carry people and those that don't and make trains. Encourage the pupils to explain the differences between the trains.



These carriages don't carry people because there are no seats or windows.

When the children are confident reasoning about their sets, begin to compare the amounts in the sets using more, less or the same/equal. If the sets are small and can be subitised, use values.

There are more carriages that don't carry passengers than do.

I can see two passenger carriages. That is less than the other train.

Both trains have one engine – that's the same.

Further opportunities for practice, recall, broadening and deepening learning

Adults could:

- When sorting the different types of building blocks, identify whether there are more or less of different types of blocks
- In the role play area, find items which could be classified for example the cutlery (into knives, forks and spoons), the toy food (into different food groups of the children's choice) or money in the till (into different coin denominations).
- During role play, organise the area and recognise when there needs to be the same value and when there doesn't. For example, in a schools role play, each toy needs a pencil so there will be the same amount of toys and pencils.

Counting the Sort (including cardinality)

HfL Learning Outcome

Accurately count a set of items, give the value of the set and be able to compare this to the amounts in other sets

Early Learning Goal

Verbally count beyond 20, recognising the pattern of the counting system

Key Concepts

This sequence will rehearse counting strategies. It is important to establish the difference between rote counting (saying the sequence) and counting with understanding (being able to say how many objects there are in a group). Identify, for example, whether pupils understand they can start with any object in the group. Adults will need to emphasise the connection between counting each object (once) and then finding the total. Through rich and regular rehearsal, children will understand the pattern in consecutive numbers where they increase by one each time and represent one more than the previous number name.

Skilled counting supports improved perceptual and conceptual subitising and is fundamental to later operating on number. They will use patterns and structures rather than remaining dependent on the sequence (not returning to zero for every count). It is important to include “zero” as an absence of objects that can also be seen / recognised / subitised as this is easy to forget. This sequence will include numerals and number names in words as further variety in the representations of values.

Steps within the Learning Sequence

- Step 1: Touching a small set of similar objects (more than one) one at a time and using counting to establish the value of the set
- Step 2: Comparing sets of mixed objects by their values through counting and matching values in grids to numerals
- Step 3: Using number names to count and compare sets of objects when their representations are not identical
- Step 4: Understanding that counting is a tool to identify a quantity (not just a sequence of number names) and using this skill purposefully

What this learning builds upon

Children are ready for this learning when they:

- Recite number names in order using rote counting
- Begin to recognise collections where there are more or fewer items (but possibly need support to count accurately and then give the value)

What this learning leads to

- Increasingly accurate estimation of amounts (as they become more familiar with seeing and counting a range of collections of items)
- Counting to aid calculation, for example counting 2 or 3 different collections to find a total amount

Behaviours pupils could demonstrate to show understanding

- Children will continue to recognise quantities up to 5 without counting (using subitising), matching them to a number name and a numeral, before ordering collections by their size.
- Children will consistently recite the number names in the correct order across varied ranges and in different contexts. They will use their counting to identify the size of the sets and comment on what is the same and what is different.
- Children will continue to allocate a number name to each item counted and be confident that the last number name recited tallies the count (gives the total).
- Children will show the same confidence even if they are unable to see or touch the items (e.g. counting noises they hear).
- Children will **not** return to zero/one to recite the number sequence again when asked, "How many are there?" after they have counted a set of objects.
- Children will count out objects with confidence when asked to meet a cardinal target – e.g. "There are 7 children at the snack table. Can you go and get the right number of cartons of milk please?"

Ways to check understanding

Children could:

- Collect the right number of cartons of milk or pieces of fruit when asked, counting out the right amount accurately and knowing that the last number they say is also the total of the set.
- Use numbers as labels, matched to varied representations of value within role play. For example, label the boxes for bandages with how many they should contain and then ask the children to check that there are the correct number of bandages in the box.
- Use (and tidy up) equipment organised around the environment that requires them to count and check totals (including identifying the total as the final number of the count). For example, the scissors pot could have the numeral 5 displayed along with a picture of a pair of scissors. Can the child correctly put 5 pairs of scissors back in that pot?
- Match dot patterns to numerals using subitising and/or counting first to establish 'how many'.
- Count small collections of different objects and compare the size of sets. For example, in the water and sand trays, "How many yellow fish are in the water today? Are there more or fewer red fish?"
- Use dot patterns, photographs of sets, playing cards, Numicon®, Plasticine® and match the sets / images to numerals / digit cards. Can they order them?

Step one

Touching a small set of similar objects (more than one) one at a time and using counting to establish the value of the set

As the children continue to develop the familiar pattern of verbal counting, the adults will support the children to see and hear that the total of a group of objects, once counted, is a fixed quantity that can be named and compared. Children may need to count each object to secure the value of the total but the adult role is to continue to encourage the children to subitise where there are up to 5. Practise counting (and subitising) small groups of objects with the children.

How many are there?



That's right. You said you saw three. You started at zero and you counted 1, 2, 3. What do you notice?

I can see three. Look - one, two, three. There are three.

It's three again.

That's right. Do you think that will happen again?

Children could gather some pasta shapes, e.g. four pieces of pasta, and stick them on card (or a similar activity) counting out a number and saying how many they have.

How many pieces of pasta are there?

There are four.
1, 2, 3, 4.

This now becomes their model for comparison. The children should go on to identify the matching values, using a range of representations of the same amount e.g. dominoes, dice, playing cards, Numicon®, dice with numerals, digit cards and numbers as words.

Further opportunities for practice, recall and broadening understanding

Adults could:

- Count the sets of different fruits in the fruit bowl, touching each piece as they are removed and comparing the sets of bananas and apples for example. Encourage the children to place the fruit in familiar arrangements and subitise to identify a total number of each type of fruit.
- Use large tweezers to place one marble in each mould of a muffin tray, reciting the number names with confidence. Use the array to subitise the total.
- Use play dough to make sets of shapes using different colours and ask the children to identify sets before touching each member of the set and reciting the number names accurately to count them.
- Repeat similar activities in small world, construction, sand, water, outside with natural objects or arts and crafts materials.
- Provide interactive displays which use different materials to present an amount, up to ten, in a recognisable arrangement. Continue to use numerals and numbers as words alongside as further representations.

Step two

Comparing sets of mixed objects by their values through counting and matching values in grids to numerals

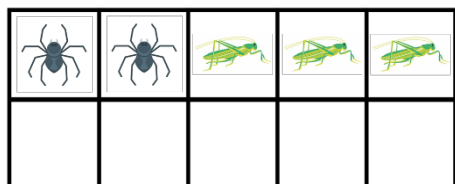
Ask the children to gather natural objects (such as stones, leaves or conkers) and to place the correct number in the basket on the labelled bike.



How can we check if the right number of things are in the basket?

We can count them.

Continue to decompose numbers and focus on making and identifying (subitising) smaller quantities in slightly larger sets. This allows you to start the count at different numbers so that the children do not become too reliant on counting in ones as their only strategy. They must be encouraged to continue to improve their subitising skills.



How many things do you see?

Three grasshoppers there and two spiders there.

One, two, three, four five.

What happens when you count them?

Children will need plenty of practice in all zones of the environment to match values using many different variations. This may include using handout_RLS6_step2_value_match. The term zero or nought must be used regularly to identify a total in order to be satisfied that the children can subitise zero and will begin to secure the understanding that zero is one less than one.

Further opportunities for practice, recall and broadening understanding

Adults could:

- Use opportunities such as counting the sets of different fruits in the fruit bowl to challenge where the children will begin to count the fruits, for example which type to count first.
- Continue to encourage the children to place the fruit in familiar arrangements in order to subitise and continue the sequence in counting wherever possible.
- When the children use tweezers to place one marble in each mould of a muffin tray, change the starting point in the mould several times when reciting the number names with confidence and identifying the total quantity of marbles. Reinforce the use of the array to subitise the quantity too and identify the matching total.
- Embed the subitising and change of position to start the count again when children work with the play dough to make sets of shapes using different colours. The children should continue to identify sets before touching each member of the set and reciting the number names accurately to find the total.
- Repeat similar activities in small world, construction, sand, water, outside with natural objects or arts and crafts modelling the development of subitising and counting to link number names to their positions in the counting order and establish the last number name tallies the count.

Step three

Using number names to count and compare sets of objects when their representations are not identical

Ask children at the water to use their fishing rods to “catch” several magnetic objects and keep them in a net. When they have enough (any amount from 4 to 10 for example) ask the children to identify how many items they have caught. The adult should step back and observe the children’s approaches to identify the total number of items they have caught.



Clarify the amount of items in their net and provide a selection of representations of numbers, for example: playing cards/ dice/ dominoes/ tens frames picture cards/ Numicon® pieces match these to the number of items in their net. Ask the children to look at each other’s collections and identify matching totals, more and less, again to reinforce the learning in previous sequences (RLS1 and RLS2).

So how many do you have altogether in your net?

**1,2,3,4,5,6,7. I have 7.
Here is the Numicon® 7.**

Does anybody else have 7?

Yes Tom has seven too.

Oh yes. Who has less than you?

Ellie has less. I can see she only has 5. 1,2,3,4,5.

Did anyone catch nothing, zero fish?

Can you find another group of 7 things outside?

Further opportunities for practice, recall and broadening understanding

Adults could:

- Vary the range and the number of toys and objects used in the water tray to challenge the fluency and accuracy of the children’s counting and to rehearse the accurate use of language.
- Model finding an amount identified as a target and also “finding” a total when the amount has not been previously identified, in all zones of the provision, for example, “there are 6 marked spaces in the garage to park cars. I need to get 6 cars”.
- Vary the representations of familiar dot patterns, such as dice, dominoes and playing cards to continue to provide the familiar and unfamiliar patterns of known numbers.
- Model counting strategies, such as grouping in familiar patterns (subitising) along the way or lining up the objects and separating known “sub totals” along the way – “That’s three (move the first three items aside), four, five, six”
- After a “counting” activity, push the cardinal principle by placing labelled containers or receptacles in the setting. For example, provide a few trays that have a “dot pattern” and the matching numerals, not necessarily in order and add pictures of plates. Ask children to place the correct number of plates for laying the table on the appropriate tray.
- Several opportunities should be afforded in the snack provision to find a given amount or to identify the total number of bananas etc. in the basket, in order to be sure we have enough.
- During art and craft activities and rehearsal of fine motor skills, adults may intervene to recognise similarities and differences in the children’s work by pattern and/or number.

Step four

Understanding that counting is a tool to identify a quantity (not just a sequence of number names) and using this skill purposefully

This step is only to be approached if the children are secure in their cardinal principle – i.e. that the last number counted tallies the total of the set.

Opportunities should be taken to watch the children **using** this principle with purpose. For example, the child may know the number of train carriages needed to complete the train and will go just once to the mixed collection of trains to count out the number needed before returning to the train tracks. The challenge here is that the child had to identify the target number independently and then travel across the classroom to find that given number of items.

Count the toys in the sand with the children and ask for totals, changing the number each time. Then cover the toys with the sand and ask again.

**How many toys do we have in the sand tray?
How do you know that?**

We have 8 toys under the sand. I know there are 8 because I counted them.

Sometimes the adult will provide the target and require reasoning from the children in order to gain a sense of confidence and expertise in their counting. For example, the adult may ask a child how many birthday candles they have blown out in their lifetime so far.



How could you find out how many candles there have been altogether?

I had no candles (zero) when I was born, 1 candle when I was 1 and then 2 candles when I was 2 ...

Further opportunities for practice, recall and broadening understanding

Adults could:

- Continue to play barrier games in pairs and ensure the focus is the cardinality of number. Some should be to identify a total by counting and then asking the “blind” partner to match the total. Others should include opportunities to gather a group of items identified by a “secret target number” and then the partners quiz each other to check that their totals match.
- Be sure to include the rehearsal of counting moving objects and objects the children cannot touch in these targeted activities.
- Use the mixed audio resource of everyday sounds (from Sequence 2) and ask the children to count how many of the sounds are made by musical instruments for example. Children are counting to find a total but not all the sounds are to be included.
- **If you want to challenge the children further**, you could play a form of “Taboo” where certain words **must** be used such as ‘more’ or ‘less’ and others **may not** be used, such as some of the number names.

Using Counting to Compare

HfL Learning Outcome
Use counting to compare and find a precise numerical differences in wide and varied contexts
Early Learning Goal
Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity
Key Concepts
This sequence seeks to progress the learning established in RLS6 (the cardinality principle) to explore the use of counting as a tool to calculate in different ways, as well as simply finding a total. In RLS3, the children used the language of comparison through measures and it is essential that the vocabulary learned there continues to be applied in this sequence. The ability to subitise, taught in RLS1 and reinforced in subsequent sequences, is an essential pre-requisite for meaningful calculation with numerals. By linking the children's understanding of comparison and subitising, they will learn that counting is one tool that can be used for addition and subtraction calculations. Once again, it is necessary to regularly include zero (or nought) as a value since the "starting point" for counting forwards and backwards can often cause confusion.
Steps within the Learning Sequence
Step 1: Use one to one correspondence to compare quantities Step 2: Use counting to compare totals Step 3: To count forward and backwards to identify a difference

What this learning builds upon
Children are ready for this learning when they: • Are confident at counting to 10 and know the order of increasing numbers (the stable order principle – RLS2) and can state 'how many' in a group (cardinal principle – RLS6) • Continue the count from different starting points, confident that they will still identify the total accurately • Notice similarities and differences in amounts • Recognise when there are more and less or fewer • Begin to use talk to compare amounts
What this learning leads to
• Developing a sense of number magnitude - where a number sits within the number system. • Developing increasingly accurate estimation skills including to estimate quantities and values with a degree of accuracy (RLS9). • Beginning to understand operational relationships and a more fluent understanding of number. For example, when they can see that the difference between 5 and 8 is 3, this leads to understanding that $5 + 3 = 8$ and $8 - 3 = 5$ more deeply.

Behaviours pupils could demonstrate to show understanding

- Children will make decisions about what order a set of objects go in using given attributes.
- Children give reasons and describe the attributes of an object or value where making a comparison.
- Children will respond appropriately to questions with accurate detail to explain their reasoning for comparison.
- Children independently find more things to compare and order using criteria that they have experienced before.
- Children can identify attributes by which a group of given objects could be compared or ordered.
- Children know that when comparing amounts, the size is unimportant and that each object only counts as one.
- Children will show sustained engagement in comparing and ordering the same group of objects in multiple ways.
- Children independently find more things to compare and order using criteria that they have created themselves.
- Children will reason their choices and explain their thinking in the comparisons and orderings they have made.
- Children should begin to use comparison by quantity independently and with purpose.

Ways to check understanding

Children could:

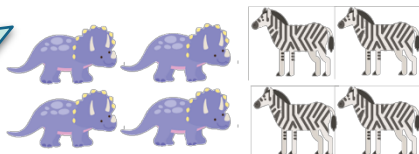
- Use the language of comparison such as 'more', 'less' or 'equal' with increasing accuracy, indicating how much more or less.
- Respond to challenging questions, comparing sets of objects that include numerical comparison.
- Count to check the differences or similarities they describe.
- Adapt their answers when different questions are asked or objects moved.
- Use the names of the children in the class to make sets based on the syllable count of each name.
- Describe a musical pattern they have played based upon the number of notes, for example, explaining which notes they play 2nd and 4th.
- Rehearse differences of size, arrangement, colour or number, making sure there are often several groups. They may use one to one counting to indicate similarities / differences between them or the order of the groups.
- Give reasons for equal or different quantities when comparing in varied contexts. They should be creating groups for a purpose and indicating the reasons for the different sizes of each group. E.g. "I need 4 hats and 8 wellies for my friends to go outside because we only have one head but we have 2 feet each."
- Begin to record and then follow patterns they have coded.

Step one

Use one to one correspondence to compare quantities

Begin with two groups of different items (animals, fruit) that are equal in number. Ask the children to use one to one correspondence to count and compare the quantities in the sets. Establish the vocabulary of equal/not equal, more and less, alongside numerical totals.

What do you notice?



There is the same number of zebras and dinosaurs.

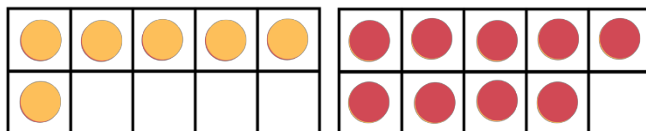
So you can see there are four objects in each set. You can see the sets are equal.

All adults must be consistent in the modelling of the language “equal” for matching values where children often use the word same. When equality is re-established and secure, ask the children to close their eyes as you subtract 3 items from one of the sets - take three dinosaurs. Ask again:

What do you notice?

There are more zebras now.

Repeat the one to one correspondence counting from above with different amounts and then use tens frames to represent each set and compare the values using counters. For example: if the yellow counters mean dinosaurs and the red counters mean zebras:



How many more zebras are there?

There are 3 more zebras than dinosaurs now.

Further opportunities for practice, recall and broadening learning

Adults could:

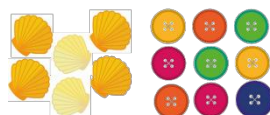
- Rephrase children’s comments to improve their use of vocabulary alongside numerical totals, e.g. equal/not equal, more and less.
- Use language to further develop a child’s understanding of the characteristics of comparison and many representations of number when counting.
- Use effective questioning to challenge children’s thinking about what they already know about comparison.
- Draw children’s attention to the language of comparison used in measures (RLS3) and make links between the language used there and here. “Can you make me a tower that is 3 bricks taller than this one?”
- Repeat previous learning experiences in the different zones of the environment and this time ask the children to count (where appropriate) in order to compare quantities, lengths, thickness or weights.
- Provide a commentary alongside varied activities to model talk about pattern and display thought processes that are appropriate to the context.
- Drum the rhythm and pattern in the syllables of the children’s names and other nouns. “How many beats shorter is Ben’s name than Abigail’s?”
- Point out patterns to be seen in the environment and talk about the repetition.
- Review patterns previously visited and compare the “units of repeat” by counting the elements in them, e.g. a dance sequence.
- Encourage children to reflect upon their use of counting to compare quantities. Take more opportunities to count backwards than forwards as this tends to be the less-rehearsed skill.

Step two

Use counting to compare totals

Take a new selection of objects, for example: 9 buttons and 6 shells, and this time use cubes to represent the two sets.

0, 1, 2, 3, 4, 5, 6, 7, 8, 9. There are 9 buttons in this pot. There are 6 shells.



What do you notice?

The towers are not equal.



1, 2, 3, 4, 5, 6. There are 6 and 3 more buttons. There are 3 more buttons than shells.

So you can see that 9 is 3 more than 6. What else can you see?

I can see that the tower of 6 cubes is 3 less than the tower of 9 cubes.

I can see that 6 is 3 less than 9.

Use the towers to model the one to one counting correspondence of removing 3 cubes from the 9 to make the towers equal.

9... 8, 7, 6. I counted back three cubes to make the towers equal. I can see that 6 is 3 less than 9.

The children pick a card from a pile that show values as mixed representations such as numerals, words, dot patterns or playing cards. They take 2 cards and make matching towers to repeat the activity above several times. Sometimes they represent the values using tens frames as in Step 1.

Further opportunities for practice, recall and broadening learning

Adults could:

- Continue to use action songs and rhymes that require counting skills to compare quantities. For example, "8 big bananas growing in the tree. Henry shook it hard and down came three." The adults model the comparison and the difference using bananas. Remember to emphasise the counting backwards modelled in the rhyme.
- Roll a die and match a number of gems in your bowl to the number you have thrown. The children play in pairs and compare the dots on their dice and the gems in their bowls.
- Take opportunities when working outside to compare numbers of objects gathered or equipment tidied etc. The adult reinforces the vocabulary of the learning sequence and scaffolds the children's responses accordingly.
- The children throw bean bags in the buckets and compare the quantities by colour or compare with the totals of their friends.
- Use opportunities when playing skittles to use the language of comparison for skittles knocked down. Rehearse counting backwards as the skittles are knocked over.
- Use the language of comparison when in the construction area and begin to include quantities. The children will be shown how to respond in a complete sentence. The children may act as a quantity surveyor for a building project for example.

Step three

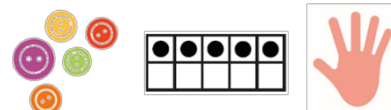
To count forward and backwards to identify a difference

Sit the children in a circle and rehearse counting in order. Establish who is number one and ask that child to find the “one spot card”, the cup with one button, hold up one finger and say the number clearly, have buttons and dots cards for each number. This continues around the circle for the consecutive numbers.

Henry. What number are you?

I am number five.

Let's start at Henry and count forwards to Caitlin. How many more is Caitlin?



Ok. Let's check the buttons and see.

6, 7, 8. Caitlin is 3 more than Henry.

The regular use of zero as a starting point has prepared the children for this but many children will count 5, 6, 7, 8 and find a difference of 4.

Continue to count (as you have with the buttons) to check a difference as you vary the activity and emphasise the starting point each time.

Gracie is 9. What if I start at Gracie and count backwards to Henry?

How many less is Henry?

8, 7, 6, 5. Henry is 4 less than Gracie.

Further opportunities for practice, recall and broadening learning

Adults could:

- Continue to provide interesting objects for the children to talk about, e.g. a collection of shells of different shapes, sizes and colours, pirate treasure (gems of different colours / sizes and coins). This time, adults will model the use of counting to identify differences by quantity alongside other properties.
- Continue to provide playdough and / or construction materials for children to make and build their own creations and then encourage children to compare the structures using quantity, colour, shape and size with varied and accurate use of language.
- Use the role play area theme to continue exploring similarities and differences, for example, in the food orders if it is a café role play. Ask the children to explain why the quantities are important. Do they use counting to check the orders match the customers' requests?
- Begin conversations which allow children to compare similarities and differences at home, e.g. pets or siblings, and classify their classmates in these sets. When the sorting is complete, model the use of counting (backwards and forward) to compare the results and find a numerical difference.
- Continue to provide ways to 'measure' what they are making or comparing, such as small cubes, tens frames and counters, measuring tapes or strips of paper. How do they use counting to identify the difference and indicate how much shorter / longer / taller things are?
- Continue to provide pan balances and items such as buttons, marbles or cubes. Children can then count the difference in mass.
- Take every opportunity to count and compare quantities when cooking with the children and using weighing scales. Ask children to compare two quantities on two separate sets of weighing scales by indicating the different positions of the arrows and counting on or back to find the difference.

Spatial Thinking

HfL Learning Outcome
Develop spatial thinking and spatial language linked to position and direction, both in movements and represented using symbols
Early Learning Goal
Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity
Key Concepts
Building spatial thinking early is essential for learning about position, direction and relationships (e.g. within patterns and to other objects). Spatial thinking is important because it is an essential human ability; navigating ourselves through our environment and making sense of where we are. It is an important contributing factor to mathematical ability. The language of spatial thinking is linked to many aspects of mathematics. Position and directional learning is the most obvious but also patterning and geometry. It is also essential when considering the relationships between numbers; knowing which numbers come 'before', 'after', 'next to' or 'in between' is important, as well as knowing how near or far numbers are from each other or from a given point. If the language of these are not fully understood in the real world, it will be difficult to use them in the abstract world of numbers. The other aspect of spatial thinking covered in this learning sequence links to understanding abstract representations of the real world. The ability to transform images from pictorial to an abstract image later supports solving worded maths problems. In this sequence, the children will go from passing through a space in reality to using maps of known spaces with symbols to represent known objects.

Steps within the Learning Sequence
Step 1: Knowledge and application of the language of position
Step 2: Knowledge and application of directional language in the real world
Step 3: Comparing routes
Step 4: Explaining routes and positions of objects in scaled versions of known environments
Step 5: Explaining routes and positions of objects in represented known environments where objects are replaced by abstract symbols

What this learning builds upon
Children are ready for this learning when they: • Use simple positional language, such as 'in', 'on', 'under', 'next to', 'on top of' • Follow one step instructions which relate to position and direction, for example, "bring me the ball that is under that chair" • Use sentences to describe the position of an object, for example, "I put my jumper in my bag".
What this learning leads to
• Following increasingly complex directional and positional instructions with several steps • Constructing plans and maps with increasing accuracy • Following plans and maps with deeper understanding of what is being represented and the idea of scale

Behaviours children could demonstrate to show understanding

- Children will know and correctly use the language of position
- Children will know and correctly use the language of direction
- Children will be able to follow verbal instructions to locate items and places in the real world
- Children will be able to follow verbal instructions to get to a given location following a given route
- Children will be able to make comparisons between journeys, commenting on distance and time using comparative vocabulary accurately
- Children will recognise known locations when represented as a model or plan
- Children will be able to follow routes on both a model / plan and in the real world
- Children will begin to understand that objects can be represented as symbols when drawing pictorial representations

Ways to check understanding

Children could:

- Give instructions about the position of an item for someone to follow, to collect the item, e.g. "The ball is under the table near the window".
- Give directions for someone to follow to reach a particular place.
- Follow instructions given verbally, which include precise positional and directional language.
- Make an obstacle course for someone else to try, explaining what they need to do at each point, e.g. "...then jump over the cone".
- Make a model, map or plan to show an area, inside or outside, which notes the key features e.g. large objects or furniture.
- Make a treasure map and mark where something has been hidden for someone else to find.
- Follow a model, map or plan and talk about what is represented and how they know, e.g. "That must be the big cupboard because I can see a big rectangle/box shape and it is near the door."

Step one

Knowledge and application of the language of position

Check children know and understand the following words/phrases: in, on, under, next to, beside, above, below, on top of, between.

This is best done by children physically carrying out those positions in relation to someone else or a piece of equipment. This could be done in a P.E. lesson or in the outside environment. When the children are in position, get them to explain where they are, checking for the correct use of vocabulary. If it is not accurate, say it correctly and ask them to echo.

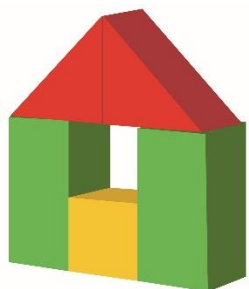
Show me under.

I am under the slide.

Show me between.

I am standing between Joe and Hari.

Encourage the children to use positional language in their play. They could use it when giving instructions, e.g. setting a course around the outdoor area, or they could give a friend instructions to build a tower or model.



The yellow block is between the two green ones. The red triangle one is on top of the two green ones. The yellow one is under the red block.

Further opportunities for practice, recall and broadening learning

Adults could:

- When explaining what is in each area in the environment, use the language of position and direction to guide children, e.g. "I've put a new set of felt pens out *on* the craft table; they are *in* the purple box." "The bears are having a sleep *under* the blanket in the role play area." "If you go outside, the scooters are positioned *between* the big tree and the shed today."
- Provide construction materials such as coloured building blocks or Lego®, and whilst children are playing, engage them in conversation about the position of pieces, e.g. "Where is the red brick? Is it under the blue brick or on top of the blue brick?"
- Ask children to collect or find something by giving verbal instructions using positional language rather than pointing to the object. "The football is under my chair." "The green pen is on the table next to the window."
- When lining up, ask a couple of children to explain who they are standing between. "Alfie, who are you standing between today in the line?"
- When sitting together, for example at snack, ask children who they are sitting beside / next to.

Step two

Knowledge and application of directional language in the real world

The children need to use directional language accurately and confidently to explain their journeys and demonstrate understanding when following directions. Directional language to secure should include: up, down, forwards, backwards, through, under, over, turn around, turn towards and other similar phrases. This language needs to be rehearsed and used regularly throughout all environments. Using handout_RLS8_step2_directional_language cut into cards may support this.

Opportunities for the teaching and application of directional language are numerous but children physically carrying out the actions will aid retention. So, as before, outside or in PE lessons provide great chances to teach this. Children can plan routes around the outdoor environment using a set number of direction words. Children could pick three or four vocabulary cards to have on their route. For example:

turn towards

over

backwards

Let's walk backwards to the fence.

Good idea. Then we can turn towards the tyres.

Yes. Then we can climb over them.

That's great. You have used all your words. Don't forget to describe your journey as you complete it.

In addition, children can be given directions to follow.

Further opportunities for practice, recall and broadening learning

Adults could:

- Support the children to create their own mini obstacle course either outside or during PE. Using any equipment available such as cones, hoops, beanbags or small mats, ask them to devise a route to be followed and then invite other children to try their route. For example, "Jump *over* the cone. Then hop *on* to the mat. Now throw the beanbag *in* the hoop."
- Ask children to describe familiar routes around the school or on their way home. To get to the hall: Do they go up or down any stairs? Do they go towards the library and then turn when they see the hall door?
- Play games involving hiding and finding treasure; children might have some gems or coins which could be hidden. They then need to give verbal instructions using directions to a friend to find their treasure. Where does their friend need to go?
- Using handout_RLS8_step2_directional_language word cards cut up, ask the children to create some illustrations for each word, to secure their understanding of the words and their meaning.

Step three

Comparing routes – the directions taken and the position of the objects on different routes (possibly longer, shorter, nearer, further)

In this step, children will be using positional and directional language to describe journeys but they will also have opportunity to rehearse the comparative language from Learning Sequence 3.

Give the children a start and end point in a familiar environment. Ask them to travel from the start point to the end point in two different ways, explaining their journeys using the correct language. For example:

Plan two different journeys from the role-play area to the classroom door.

We could go to the door past the making table or go the other way by the water tray.

Good idea. Walk both routes and describe your journeys using as many position and direction words as you can.

Let's **turn towards the window and walk **forwards** to the making table. Go **between** the making table and the writing table. Pass **under** the elephant pictures and walk **next to** the pegs to the door.**

Once the children have completed both routes to the door, ask them to compare the journeys using the correct language relating to distance and time.

**The first was shorter.
It was quicker.**

Further opportunities for practice, recall and broadening learning

Adults could:

- Support the children to create their own mini obstacle course either outside or during PE. Using any equipment available such as cones, hoops, beanbags or small mats, ask them to devise a route to be followed and then invite other children to try their route. For example, “Jump *over* the cone. Then hop *on* to the mat. Now throw the beanbag *in* the hoop.” Extend this by asking children to use the same items but in a different order.
- Ask children to describe familiar routes around the school or on their way home. To get to the hall: Do they go up or down any stairs? Do they go towards the library and then turn when they see the hall door? Extend this by asking children if there are any other routes. What is different in the other route? Which is quicker?
- Play games involving hiding and finding treasure; children might have some gems or coins which could be hidden. They then need to give verbal instructions using directions to a friend to find their treasure. Where does their friend need to go?

Step four

Explaining routes and positions of objects in scaled versions of known environments

Using photographs (or models) of the key furniture / areas of the classroom, create a plan of the classroom with the children. Whilst placing the furniture on the plan, encourage the children to use the correct positional language.

Where should the picture of the sand tray go?

Here, next to the door to the playground.

Yes it is between the door and the building blocks.

Once the plan is created, discuss what is the same and different about the actual classroom and the plan. Clarify that the plan is a representation of the classroom - it has photographs / models to show the real things in a smaller size.

Ask the children to think about the journeys around the classroom they took in the previous step.

Encourage the children to show their route using their finger, using the same vocabulary they used when completing the actual journey.

Can you show the journey you made on the plan?

As before, compare different journey lengths. String could be used to show and compare the routes. In addition, the distance between objects can be compared both on the plan and in reality.

The writing table is nearer to the sink than Mr Dixon's chair.

Further opportunities for practice, recall and broadening learning

Adults could:

- Offer drawing and mark making materials outside, e.g. large sugar paper and chalk, and offer opportunities to make a plan or map of the outside area. Discuss what they might want on their plan / map.
- Play games involving hiding and finding treasure; children might have some gems or coins which could be hidden. They then need to make a map or plan to show where they have hidden their treasure. What needs to be on their plan to help a friend understand where they need to look?
- Offer the opportunity to construct models of well-known places, such as the classroom, a room in their house or somewhere they visit often using Lego®, junk modelling, building bricks, playdough or other resources. Ask the children to talk about what they have put where (describing positions) and how they chose to represent different parts.

Step five

Explaining routes and positions of objects in represented known environments where objects are replaced by abstract symbols

Have a map of the classroom where the objects in the classroom have been replaced by symbols or images (such as those pictured below):



Identify the representations on the map and label them if necessary. When it is not very obvious what they are, use the plan from Step 4 and the position of the objects to help identify them. Discuss what is the same or different about the map compared to the plan and the actual classroom.

On the map, you can't see the legs of the table and chairs.

Explain that on a map, it is like a photograph from above – a birds eye view.

As in the previous steps, ask the children to show journeys around the space describing the position of objects and the directions taken. Also, use the map to make comparisons of the distances between objects focusing on the vocabulary of: nearer, further, closer, shorter, and longer.

Further opportunities for practice, recall and broadening learning

Adults could:

- Offer drawing and mark making materials outside, e.g. large sugar paper and chalk, and offer opportunities to make a plan or map of the outside area. Discuss what they might want on their plan / map.
- Play games involving hiding and finding treasure; children might have some gems or coins which could be hidden. They then need to make a map or plan to show where they have hidden their treasure. What needs to be on their plan to help a friend understand where they need to look?
- Provide real maps and plans, e.g. a map of the local area or plan of the school site, with landmarks the children are likely to know marked on. Add photographs and images if this would help children to understand what the map or plan is showing.
- Give children a very basic outline plan of the classroom with the room shape and windows and door/s marked but furniture not included. Ask them how they would arrange the classroom and then what they might draw to show where everything should go. "How could you show the table and chairs on your plan?"

Magnitude – Ordering and Estimating

HfL Learning Outcome

Know the position of numbers to 10 and their relationship to other numbers

Early Learning Goal

Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity

Key Concepts

By this learning sequence, children will be confident with counting to 10. They will know the order that the numbers go up in (the stable order principle – RLS2) and will be confident in counting amounts and stating 'how many'. They will be able to count from zero and other numbers knowing that the count increases by one each time (RLS6). The children will also be able to compare quantities both by subitising and counting, mainly through comparing sets by one to one matching (RLS7) and be familiar with a range of comparison language and also positional language (RLS8).

In this learning sequence, previous learning is used to encourage the children to begin to build an increasingly sophisticated 'mental number line'. Initially, the number line will be created physically as a 'staircase' so the children can see that the difference between each number is equal and goes up in ones. It will then move on to representing the count in a linear form – both horizontally and vertically – with equal spaces between the numbers. Practise using this number line, counting up and down in small steps, stating the number you are on and saying the numbers you travel to whilst understanding that values increase/decrease according to the direction of travel. This rehearses the names of numbers that are next to each other (one more or one fewer/less) but also improves number line estimation – the children's ability to proportionally represent numbers on a number line and be able to state how near to or far numbers are from key benchmarks. In this case, zero, ten and (for those that are ready the midpoint) five will be emphasised.

Steps within the Learning Sequence

Step 1: Recognise that a count starts with nothing (zero) and increases equally by one each time

Step 2: Order values in a linear way, noticing and comparing their positions to each other and key benchmarks

Step 3: Practice the count – 1 more, 1 less

Step 4: Estimate relative position using benchmark numbers

What this learning builds upon

Children are ready for this learning when they:

- Use subitising to recognise and compare small amounts
- Count using stable order principle (number names in the correct order)
- Demonstrate understanding of cardinality; knowing how many in a set and linking it to both the number name and numeral
- Compare sets of objects and recognise whether they are the same or whether there are more or less
- Use the language of spatial thinking in relation to the position of numbers on a number line

What this learning leads to

- Developing a sense of our number system as the model of the number line expands to include larger numbers beyond 10 and 20
- Estimating the position of numbers confidently and with increasing accuracy, based on their growing understanding of the number system and magnitude
- Counting using the benchmark numbers, for example counting in 5s or 10s, noticing that on a number line these would be spaced equally

Behaviours pupils could demonstrate to show understanding

- Children will confidently count up and back to ten from zero and will be able to count on from a given number in that same range.
- Children will be able to find one more or one less than a given number to 10.
- Children will be able to recognise when a number has been missed from the count either when spoken, represented physically or on a number line
- Children will be able to explain the relationship to other numbers – especially the benchmarks 0, 10 and possibly 5 – using appropriate vocabulary: next to, between, near to, further away from.
- Children will begin to be able to position values / numerals proportionally correctly on a blank number line giving simple reasons for their positioning.

Ways to check understanding

Children could:

- Make a staircase using towers of cubes or Cuisenaire rods and then say how many would need to be in the next stair (or its colour of using Cuisenaire)?
- Look at a staircase with a gap or missing stair and identify what is missing and where it should go?
- Listen to an adult counting in sequence and identify the number missed?
- Notice the mistake within a representation (e.g. using numerals, dot patterns, towers of cubes or Numicon® pieces) and say how it should be corrected? Mistakes could include numbers swapped or missing.
- Say what is one more or one less than a given number and prove the number in a variety of ways and in different situations? E.g. “We have 5 bananas for snack today and we need one more. How many will we then have?” Or pick an amount represented by dots (e.g. on a dice) and collect the number of dinosaurs that is one less than the number shown by the dots.

Step one

Recognise that a count starts with nothing (zero) and increases equally by one each time

Have cards for numbers 0-10 and give them out to the children. Ask them to make a tower of cubes to match the value on the card. Observe the children counting out the cubes and making the tower.

Nyssa I can see you have the zero card. Why aren't you getting any cubes?

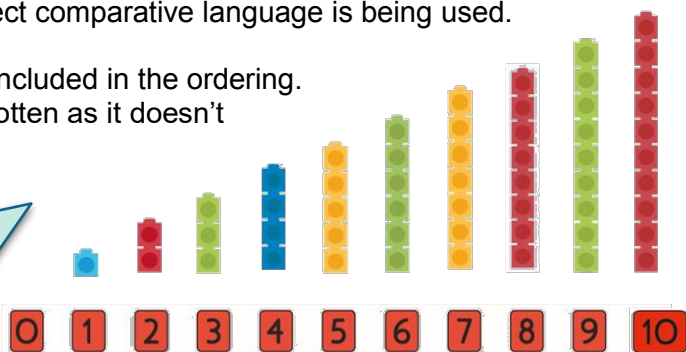
I don't need any cubes because zero means I get nothing.

Clarify that all the children know that zero means that you have nothing in the set.

Ask the children to order their towers from smallest to largest labelling their tower with the number card. Observe how the children do this and check that the correct comparative language is being used.

Check that zero is included in the ordering. It will be easily forgotten as it doesn't have a tower.

What do you notice about the towers and the numbers?



The numbers are in the right order: 0, 1, 2, 3...

The towers get longer by one each time.

Clarify that the towers increase by the same amount each time so the difference between the numbers is equal.

Further opportunities for practice, recall, broadening and deepening learning

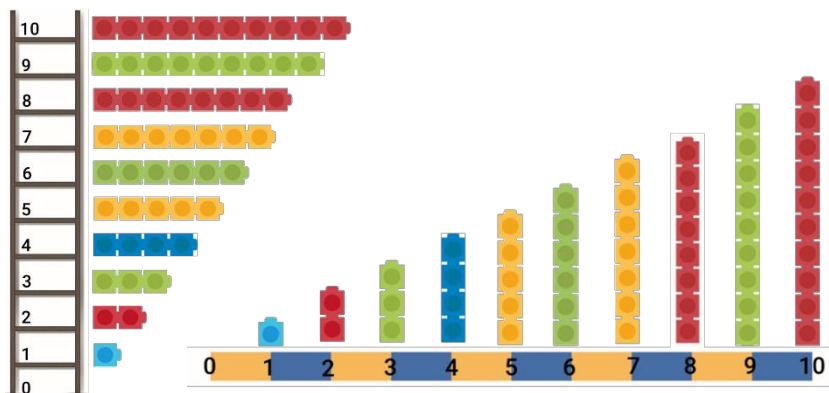
Adults could:

- Provide other resources which could make towers/lengths to then be ordered, for example Lego, beads and string, or cotton reels. Reinforce starting at zero and increasing by one each time. Children could make their own labels for their towers/lengths
- Order 0-10 in a variety of representations e.g. dot cards (see handout RLS9_step 1_dot cards), tens frames cards 0-10 (see handout RLS9_step1_tensframecards), Numicon® pieces, towers of Lego® bricks, always point out that the order increases by one each time, noticing the 'one' that is more than the previous.
- When playing in the role play, set it up so that you have collections of things and labelled places to put them e.g. baskets with 1 stethoscope, 2 white coats, 3 bandages, 4 sick bags etc. The children could carry out 'stock-checks'.
- When playing, ask children to collect you 'zero' of something, e.g. "Can you pass me two bandages and zero stethoscopes please?" it will seem strange but will re-enforce that zero is nothing but nothing can be counted.

Step two

Order values in a linear way, noticing and comparing their positions to each other and key benchmarks

Using the towers from Step 1, match the towers to a number line. Have a variety of different number lines to match the towers to. This might include vertical and horizontal orientations, familiar real objects (e.g. a ladder) or mathematical models (e.g. a counting stick). On each, the value should be shown on the lines. Note: A number line marks the values on the lines as opposed to a number track which numbers the spaces.



Once the children have matched the towers once, get them to pick a tower randomly and match it to its value, stating facts about its position. Encourage them to use positional language and more or less.

My tower has one cube.
1 is near the start. It is
one more than zero.

I have 5. That is in the
middle. It is next to 4
and one less than 6.

I have 10. That is at the
end, a long way from 0.

I have 7. It is nearer to
10 than zero.

Further opportunities for practice, recall, broadening and deepening learning

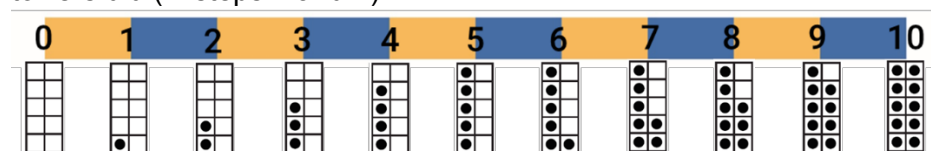
Adults could:

- Provide at least one visual number line at child height in the environment. This could be horizontal or vertical and should have a variety of different representations e.g. the numeral alongside dots or images.
- Provide other resources which could make towers/lengths to then be ordered, for example Lego, beads and string, or cotton reels. Reinforce starting at zero and increasing by one each time. Children could make their own labels for their towers/lengths and create a line to put them along.
- When children are using the construction materials (building blocks), ask them about what they are building; "How tall is that wall? Is it nearly 10 bricks tall?" The child might count how many bricks high and go on to say if the amount is close to 10 or not.

Step three

Practice the count – 1 more, 1 less

Provide another model of the numbers to 10 on a number line using tens frame representations of the numbers 0-10. Discuss with the children whether the dot on the tens frames increases by one each time as the towers did (in steps 1 and 2).



Practice counting up and down the number line starting from a variety of numbers to develop fluency. Incorporate games such as:

- Boomerang: place a picture of a boomerang on the counting stick which indicates the number the children are to count up to and then back from. For example, if the boomerang is placed on 6 – 0, 1, 2, 3, 4, 5, 6, 5, 4, 3, 2, 1, 0.
- Hiccup: children count forwards or backwards until an adult hiccups. Children then go back to the previous number and then continue. For example 10, 9, 8, (hiccup) 9, 8, 7... or 3, 4, 5, (hiccup), 4, 5, 6...

Through regular rehearsal, pupils will be saying one more and one less when counting but they will need to be able to state the numbers one more or one less than any given number. How this can be stated can vary and children need to be confident with all variations. Children could pick a number between 1 and 9, using a number line to help state one more and one less than the chosen number in a variety of ways.

One more than is .

One less than is .

is one more than .

is one less than .

Further opportunities for practice, recall, broadening and deepening learning

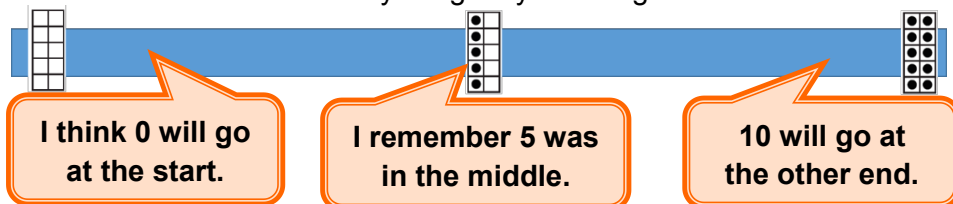
Adults could:

- Provide a visual number line in the environment at child height. This could be horizontal or vertical and should have a variety of different representations of the numbers 0-10 which change over a period of time.
- On the visual number, line numbers could be swapped around for the children to notice and then explain and correct the mistake.
- On the number line, some of the numbers/number representations could be 'blown off by the wind' and need replacing. Ask the children to put the numbers back in the correct places, reasoning their choices.
- For children that are ready, find two more or less than a given number within ten. Ensure that they can articulate what they know using the variety of models shown within step 3. For example, "Two more than 6 is 8. So 8 is two more than 6."

Step four

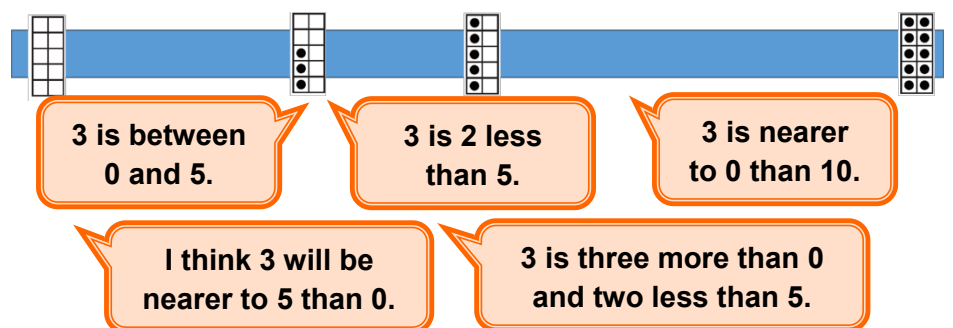
Estimate relative position using benchmark numbers

Have a blank number line (e.g. a piece of border roll) and explain that this is going to become our number line from 0 to 10. Have zero (0), five (5) and ten (10) represented either as a dot pattern, Numicon© or a tower of cubes etc. Ask the children to place the representations on the blank number line where they think they should go.



After discussion, ensure that 0, 5 and 10 are correctly positioned.

Ask the children to pick other numbers and think about where they should go. Encourage them to make comparisons to the benchmarks using positional language to describe the position.

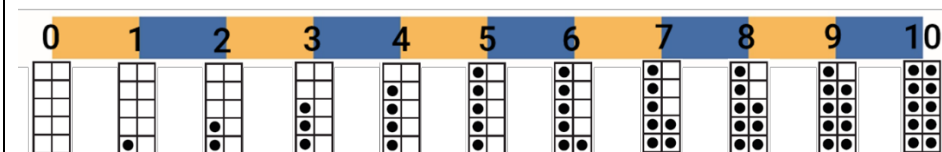


The ideal is that the numbers end up proportionally spaced along the number line. This is very challenging so focus on the explanations for the position of the numbers and checking that once all the numbers are placed, they are in the correct order.

Further opportunities for practice, recall, broadening and deepening learning

Adults could:

- Provide at least one visual number line in the environment at child height. This could be horizontal or vertical and should have a variety of different representations e.g. the numeral alongside dots or images. The benchmark numbers might have an extra symbol (e.g. arrow), to show their importance.
- When children are using the construction materials (building blocks), ask them about what they are building; "How tall is that wall? Is it nearly 10 bricks tall?" The child might count how many bricks high and go on to say if the amount is close to 10 or not.
- To aid children's understanding of the magnitude of numbers to 10, playing a simple game can help. Have a number line ready. The children start with a counter on 0. Use an adapted dice with only 1 and 2 marked on or use a spinner with 1 and 2 on. The children roll the dice (or spin the spinner) and count on the number shown. It is important that the children start the count from the number they are on and count on. For example: if they are on 7 and role a two, they say, "I am on 7, I need to count on two places – 8, 9."



Regrouping the Whole

HfL Learning Outcome

Have a deep understanding of the numbers to 10
Have automatic recall of numbers to five and know some bonds to ten

Early Learning Goal

Have a deep understanding of number to 10, including the composition of each number

Key Concepts

This is the first of three sequences that introduce the fact that numbers are made up of other numbers. It begins to explore that the whole can be regrouped into different parts and parts can be combined to make a whole. The vocabulary of parts and whole will be emphasised throughout the sequence. It is very important that children become confident with both the vocabulary and the identification of the whole and the parts as this is crucial to understanding many key concepts within mathematics.

In this sequence, the focus is on regrouping the whole and identifying what values are hidden within numbers. The children will draw on many of the skills learnt and rehearsed in earlier sequences. Children will be encouraged to see values hidden within numbers using subitising.

The children's understanding of equal, more and less will continue to develop and the term 'altogether' will be used to describe the whole.

Steps within the Learning Sequence

- Step 1: Identify parts within a given whole using subitising
- Step 2: Regroup a whole into two parts using subitising, recognising that when combined, they equal the whole
- Step 3: Identify that a whole can be broken into many parts
- Step 4: Use subitising to identify multiple parts within a given whole
- Step 5: Using a mixed set of objects to create a given whole, identify parts and provide reasoning for the groupings

What this learning builds upon

Children are ready for this learning when they:

- Subitise small amounts, saying how many there are without counting
- Count reliably to 10 and use the cardinal principle to say how many there are in the group
- Classify and group objects according to attributes such as colour or size

What this learning leads to

- Using their subitising of small amounts combined with their understanding of addition of single digit numbers to then work out larger amounts – conceptual subitising. For example, knowing that there are 9 from first subitising a 4 and a 5 and then finding the whole of these two parts.
- Developing recall of number bonds to 10 with understanding
- Calculating beyond 10 when they are ready, including when passing a tens number such as $8 + 5$ or $17 + 4$

Behaviours pupils could demonstrate to show understanding

- Children will know that numbers (the whole) are made up of other values.
- Children will be able to find parts within the whole.
- Children will identify two parts that make up a given whole.
- Children will use subitising to see the parts that make up the whole.
- Children will be able to regroup a whole into multiple parts.
- Children will recognise the whole, even when the set is mixed, and regroup it into parts.
- Children will begin to be able to explain their reasoning for the parts they create within the whole.

Ways to check understanding

Children could:

- Recognise smaller values within a number when given an amount in a familiar dot pattern, for example, a five Numicon® piece. The larger 'base' piece could represent the whole and the pieces laid on top which cover the whole base exactly could represent the parts. This would allow pupils to show their understanding of a number made of up of parts, e.g. a five piece with a three and a two laid on top to cover it exactly.
- Identify ways in which sets of related objects could be regrouped, e.g. a collection of vehicles. Identify a group as part of the whole. For example, 7 vehicles could be regrouped as 4 cars and 3 trucks or they could be grouped differently by colour.
- Place counters on a tens frame in different arrangements and describe what they see using subitising. For example, if they arrange 6 counters, they might then subitise a group of 4 and group of 2 within that 6.
- Discuss what they can collect without getting 2 items the same when challenged to collect a range of different items outside. They might bring a stick, leaf, stone, ball, cone and chalk. Once there are a few items, explore how they might be grouped. Create groups and then use subitising to say how many are in each group (if the amounts are small enough). Talk about the parts and the whole and then count to find the total.

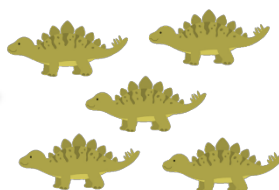
Step one

Identify parts within a given whole using subitising

Show the children a familiar subitisable dot pattern, e.g. the five on a dice. Check they instantly recognise the value.



Get the children to copy the pattern with objects. These could be counters, cubes, conkers or dinosaurs, for example. Initially use the same objects to make the pattern.

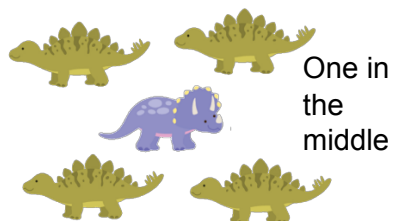


Do you notice any other familiar dot patterns within the five dinosaurs?

I can see three going diagonally across.

I can see one in the middle.

Encourage the children to swap the dinosaurs for different ones to show the value they can see.



Provide lots of opportunities throughout provision, inside and out, for children to notice smaller subitisable values within larger sets. It is not essential that the children know the value of the whole but it is important that they know that the value they subitise is part of the whole.

Further opportunities for practice, recall and broadening learning

Adults could:

- Encourage the children to subitise smaller values within a bigger set when building in the construction areas. For example, when building a tower with multi-coloured bricks, encourage the children to subitise how many red bricks they have used.
- Provide muffin trays with the playdough and / or within role play. Encourage the children to put things they make within the tray (the whole) and subitise the part they have filled. Continually model the part and whole language, for example, "You have put 4 cakes in the muffin tray. Four is part of the whole tray."
- Offer counters to arrange on a tens frame. Children place them in different arrangements and describe what they see using subitising, for example, if they arrange 6 counters, they might then subitise a group of 4 and group of 2 within that 6.
- Ask children to collect natural objects around the outside area such as twigs, leaves and stones. Once they have a small collection, make little groups and explore how many there are by subitising where the group is small enough.

Step two

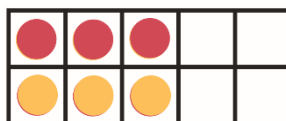
Regroup a whole into two parts using subitising, recognising that when combined, they equal the whole

Provide another familiar subitisable dot pattern, for example, six double sided counters on a tens frame. This is the whole. Encourage them to notice a part within the whole.



I can see three counters on the top row.

Encourage the children to show the part they can see by flipping over the counters.



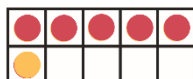
What can you tell me about the counters you didn't flip?

There are three of them left yellow.

Clarify that, having flipped over some of the counters, they have created two parts – three red counters and three yellow counters. When these are combined, there are six counters **altogether**; the whole.

Make all the counters the same colour again and encourage the children to see a part of a different value within the whole. Show this by flipping the counters. Identify the value of the other part by subitising. Clarify that the whole can be recreated by combining the parts together.

If the children want to, they can move the counters within the tens frame to help see the different parts within the whole but check they know the whole hasn't changed.



I can see within the whole.
This is a part of the whole.
I can see the other part is .
Altogether the two parts make the whole .

Further opportunities for practice, recall and broadening learning

Adults could:

- Have a number of skittles which can be subitised (6 or fewer). This is the whole. Children knock over as many as they can with a beanbag or ball. Identify how many they have knocked over as one part and how many are left standing as another part. Clarify that if they combined the two parts, they would have the whole number of skittles altogether.
- Provide whole collections within role play, for example, plates, cups, knives and forks and cakes for a tea party, all in subitisable groups. Encourage the children to identify the parts within the whole when setting up the tea party. For example, there are five cakes and they are regrouped so three are on the cake stand and two are on plates. The whole is still five cakes.
- Give the children a target number and, using dominoes, they try to find all the dominoes that have that number of dots altogether where either side of the domino would become a part. Talk to them about what they notice if one side of the domino shows 0 dots.
- Give the children a subitisable Numicon® piece (the whole) and they find as many combinations of two other Numicon® pieces that match the given piece, identifying these as the two parts.
- Play 'bunny ear'. Give the children a whole using a familiar dot pattern. Children identify how the number could be regrouped into two parts and show each part on their fingers on top of their heads like bunny ears. When confident, less familiar dot patterns could be included.

Identify that a whole can be broken into many parts

Ask the children to build a long train with a variety of different carriages; agree that it is the **whole** train.



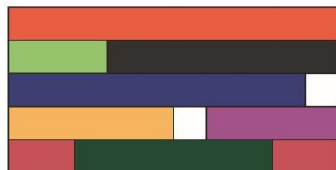
I think we could sort it into three groups / parts.

**All the carriages
for passengers
go together.**

**The engines are
part of the train.**

Cuisenaire rods provide opportunity for the children to create rows in a wall to make a given whole in a variety of ways. Using the different coloured rods, they can find different ways of regrouping the whole into multiple parts that are equal to the given whole.

**The orange rod is the whole.
Yellow, white and purple are
parts that equal the whole.**



Red, dark green and red are equal to orange.

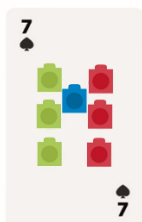
Adults could:

- Provide opportunities for the children to regroup whole collections of similar objects in a variety of ways, recognising the multiple parts the whole could be grouped into. For example, a bowl of different types of fruit.
- In role play, have groups of similar objects that could be regrouped in a variety of different ways. For example, pairs of glasses in an opticians.
- In the book corner, discuss different ways of grouping the books. Each group of books is part of the whole set of books in the book corner.
- Identify ways of grouping the different types of farm animals in small world play. All the animals are part of the whole farm but they could be regrouped into sheep, cows, horses, pigs and farmers (humans). Each group is part of the whole farm.

Step four

Use subitising to identify multiple parts within a given whole

Provide a value with a given total, for example, a playing card. Identify different quantities within the whole and place different coloured cubes or counters over the dots (spades) to show amounts in the different parts.



I can see two groups of three and a group of one.

There are three different colours of cubes so there are three parts.

Clarify that when the parts are combined, they make the given whole.

This speaking frame can be used by adults to support the children's developing use of precise mathematical language.

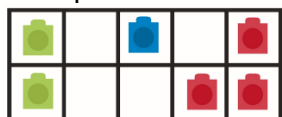
The whole is .

I can see , , ... and within the whole.

The whole has been regrouped into parts.

Altogether, the parts of , , ... and make the whole

Provide a variety of collections of similar objects to be used to identify parts within a given whole. The whole should be subitisable. For example:



The whole is 6. I can see 2, 1 and 3 within the whole. That is three parts.



I can make four parts. 1 yellow, 1 orange, 1 green and 2 pink. Altogether there is 5.

Further opportunities for practice, recall and broadening learning

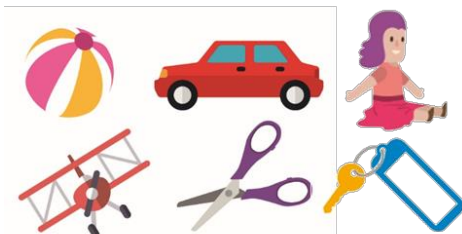
Adults could:

- Play tens frame flash. Show a tens frame with a collection of counters on it and the children quickly identify the given whole and consider ways it could be regrouped into multiple parts.
- Explore regrouping when sorting or putting away small collections of familiar objects (up to 8 items). This could be the bikes and scooters, gardening tools or different types of scissors. Identify ways they could be regrouped and organise them as suggested by the children. For example, when putting away the ride-ons, the two with three wheels could go together, the 3 scooters could go together and the go cart could form a group on its own.
- Give the children a Numicon® piece and ask them to find as many ways as possible of making the same amount using three or more pieces.

Step five

Using a mixed set of objects to create the given whole, identify parts and provide reasoning for the groupings

Provide a set of objects that have no collective connection but make the whole set a subitisable amount.



Invite the children to regroup the whole into multiple parts, giving reasons for their grouping. Use the speaking frame from the previous step to support children's accurate use of language to describe the parts they create within the given whole.

The whole is 6. I would create two parts of 4 and 2. I would put the four toys together as one part and the scissors and the keys together as another part.

I can see a group of 3, a group of 2 and a group of 1, so three parts within the whole of 6. I would put the things that roll together. I would put the key and scissors in a group because they both do something and the dolly on her own.

Provide opportunities for subitising and regrouping a variety of given collections (the whole). This could include groups that are less easy to subitise, e.g. items floating in water.

Further opportunities for practice, recall and broadening learning

Adults could:

- Challenge the children to collect a range of objects outside without having 2 items the same. They might bring a stick, leaf, stone, ball, cone and a chalk. Once there are a few items, explore how they might be grouped.
- Set a scavenger hunt within the classroom using picture clues of around 6-8 objects which can be found within the room. Then look at ways of classifying the objects, for example, by colour, type / use, where they are found and / or size
- Play a version of Kim's game. Revealing a few random objects on a tray, discuss them and how they could be grouped before covering them up with a cloth and seeing what can be remembered. Talk about whether the groups help the children to remember the objects.

Regrouping parts to find the total (the whole)

HfL Learning Outcome
Have a deep understanding of the numbers to 10 Have automatic recall of numbers to five and know some bonds to ten
Early Learning Goal
Have a deep understanding of number to 10, including the composition of each number. Automatically recall number bonds up to 5 and some number bonds to 10, including double facts.
Key Concepts
This is the second of three sequences that focuses on how numbers are made. In this sequence, the children will be combining parts to create a whole. This is the start of calculating – addition. The children will use their subitising skills when combining small parts to make subitisable wholes. Where the whole they create by combining parts is too large to subitise, the children will use their counting skills to find the whole. Initially, they will combine both parts and count all to find the whole (aggregation) and then move on to counting on from one part to find the whole (augmentation). Children will also explore where the order matters when combining parts. In addition, the children will begin to notice and find different parts that can be combined to make the same whole; concluding that there are lots of different ways to make a total.
Steps within the Learning Sequence
Step 1: Regrouping subitisable parts to make subitisable totals Step 2: Regrouping subitisable parts and counting all to find the total Step 3: Recognise that regrouping different combinations of parts can make the same whole Step 4: Subitising one part and then counting on the number in the other part to find the whole Step 5: Counting on from either part makes the same whole

What this learning builds upon
Children are ready for this learning when they: • Subitise small amounts, saying how many there are without counting • Count reliably to 10 and use cardinal principle to say how many there are in the group • Classify and group objects according to attributes such as colour or size • Know that amounts can be decomposed into parts (using learning from previous sequence RLS10 Regrouping the Whole).
What this learning leads to
• Developing calculation strategies and beginning to consider efficiency • Understanding that addition is commutative (it does not matter in which order the parts are combined; the whole remains the same) • Using their subitising of small amounts combined with their understanding of addition of single digit numbers to then work out larger amounts – conceptual subitising. For example, knowing that there are 9 from first subitising a 4 and a 5 and then finding the whole of these two parts. • Developing recall of number bonds to 10 with understanding, recognising that there are multiple ways to make an amount • Calculating beyond 10 when they are ready, including when passing a tens number such as $8 + 5$ or $17 + 4$, recognising that a part could be regrouped to aid the calculation (Think 10)

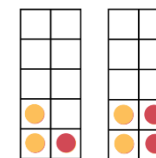
Behaviours pupils could demonstrate to show understanding

- Children will know that when parts are combined, a whole is made.
- Children can use subitising to identify the parts and calculate the whole (of quantities of 6 or fewer).
- Children will combine different parts to make the same whole.
- Children will use a count all strategy to find the whole.
- Children will use a count on strategy to find the whole.
- Children recognise that it doesn't matter in what order the parts are combined; the same whole is created.

Ways to check understanding

Children could:

- Collect a small number of objects from around the room, e.g. "bring me a few green things". When 2 children have each collected a few items, ask them to find the total. Observe how they do this.
- Be given small groups of different objects and be asked to say how many in total. Focus on the children's ability to subitise both the parts and the whole (when the whole is 6 or fewer). If the whole is more than 6, after subitising, the parts may need to be counted to find the total.
- Have representations of values up to 5 in recognisable patterns, for example, dice dot patterns or dots on tens frame cards, to pick two values and find the total. Observe carefully how they do this. Do they subitise the parts and the total (the whole), count all – the parts and then all of the whole by combining the parts or count on from one part to calculate the total.
- Find different combinations of parts to find the same whole.
- Be asked to find the total of two groups of objects, for example, pears and bananas. Ask the children to find the total initially starting with the pears and then adding the bananas, then starting with the bananas and then adding the pears. Observe and listen to what they notice. Take note of how clearly they can explain why the order of the fruit doesn't matter.



Step one

Regrouping subitisable parts to make subitisable totals

Provide the children with small collections of counters, cubes or natural objects such as acorns (4 or fewer) in opaque bags or boxes. Ask the children to tip out the counters, cubes or natural objects from one bag and subitise how many there are. Then do the same with the other bag.

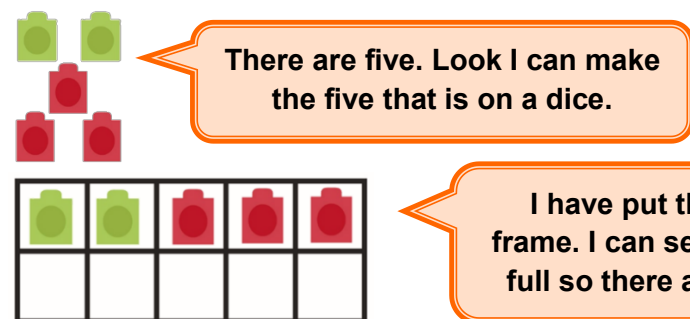


Introduce 'finding the total' and clarify that the total is the whole. Ask the children to regroup the cubes (the parts) from both bags and find the total.

What is the total number of cubes?

Can you see how many in total without counting?

Encourage the children to position the cubes into known patterns or use familiar structures, such as the tens frame, to help them see the total.



Provide opportunities for the children to regroup small amounts (parts) in different contexts to create subitisable wholes. This could include regrouping three parts if you feel the children are ready.

Further opportunities for practice, recall and broadening learning

Adults could:

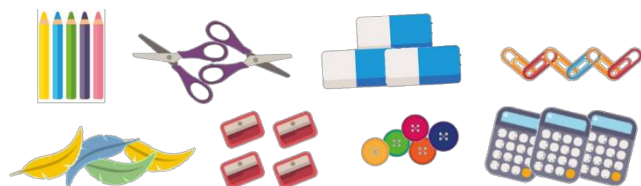
- Put two different fruit snacks on a plate and encourage the children to subitise the number of each type of snack and the total. For example, on a plate, have two carrots and three pears.
- Set up a garage role play with a tool chest. In each box / draw is a small selection of tools. Encourage the children to pick to boxes / draws, identify how many tools are in each box / drawer and find the total.
- Have an opaque bag with a selection of the one, two, three and four Numicon® pieces. The children pick two pieces, identify their value and then put them together to see the total.
- Ask children to collect a small number of objects from around the room, e.g. "bring me a few round things". When 2 children have each collected a few items, ask them to find the total. Observe how they do this. "How many round things did you find altogether?" Focus on the children's ability to subitise both the parts and the whole (when the whole is 6 or fewer). If the whole is more than 6 then after subitising the parts, counting may be needed to find the total.

Step two

Regrouping subitisable parts and counting all to find the total

In this step, focus on subitising the parts but when the parts are regrouped, the total made is too large to subitise so count all to find the total.

Provide multiple collections of small amounts, for example, have a shop set up with multiple collections of groups of objects, e.g. a stationary / craft shop.



Ask the children to pick two items (the parts), for example, the feathers and the buttons. Identify how many of each there are, either by subitising or counting. Count all to find the total (the whole).

I can see four feathers and five buttons.

1,2,3,4 5,6,7,8,9. Four add five makes nine.

1,2,3,4,5 6,7,8,9. Five add four also makes nine. It doesn't matter which I count first, It's the same total.

Can you count them all to find the total (the whole)?

You counted the feathers then the buttons. Now count the buttons then the feathers. What do you notice?

Further opportunities for practice, recall and broadening learning

Adults could:

- When playing on the play equipment outside, pick two elements, for example, the tyres and the steps on the climbing frame. Ask the children to identify how many of each, e.g. 4 tyres and 5 steps, and then find the total by jumping from tyre to tyre and then counting the steps up the ladder.
- Have two different colours of play dough. Make a selection of 'treats' in each colour. Subitise how many of each and then count how many in total.
- When playing in small world, identify small collections of similar items, for example, giraffes and penguins in the wild animals. Identify how many in each group and then count all to find how many in total.

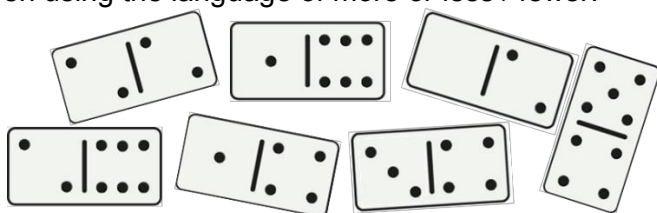
Step three

Recognise that regrouping different combinations of parts can make the same whole

Give the children a domino. Explain that a domino has two parts (the value represented on each side of the domino) and that these can be combined to make a whole. Encourage the children to subitise the parts and model counting all to find the total (the whole). Agree that there are seven dots in total. Show that it doesn't matter whether the five is counted first or the two; the total is always seven.



Provide the children with a collection of dominoes but not the whole pack as this could be overwhelming. Ask the children to try and find more dominoes that have seven dots (ensure there are some in the dominoes provided). Encourage the children to subitise the parts and count all the dots to find the total (the whole). Some children may subitise the whole because the values are small enough and some may count on from one part to find the total – this will be looked at in more detail in the next step. When the children find a total that isn't seven, ask them to compare the total to seven using the language of more or less / fewer.



That one has four - two and two make four. That is less than seven.

1,2,3 4,5,6,7. Three and four is seven.

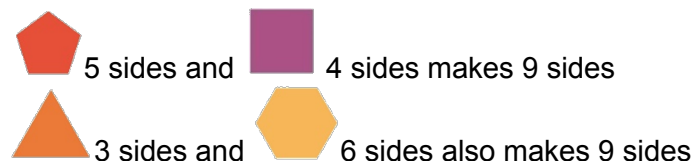
Six and one more is seven. The same!

I see five and four. 1,2,3,4,5,6,7, 8,9. That one is more than seven.

Further opportunities for practice, recall and broadening learning

Adults could:

- Give the children a familiar representation of a value, for example, a tens frame card, Numicon® piece, dice dot pattern or a playing card. Use the familiar patterns to make the same value in different ways.
- Look at the number of sides different shapes have, e.g. a square has 4 sides, a triangle has three etc. Have two shapes, for example, a pentagon and a square, and together find the total number of sides – 5 sides and 4 sides equals 9 sides altogether. Challenge the children to find other combinations of shapes that altogether have a total of nine sides.



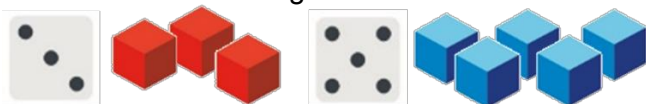
- Make a tower with two different coloured cubes. Ask the children to identify the parts of the tower and the total. Encourage the children to make towers of the same size but change the combination of parts that make the tower.

Step four

Subitising one part and then counting on the number in the other part to find the whole

The context used in this step could be a repeat of the ideas in steps 1 to 3 or the idea suggested below. The important thing is to focus on the concept of counting on.

Alter two dice so that the six is covered on both and they show zero / nothing instead. Also, have two sets of items, for example, building blocks. Roll the two dice, subitise the amounts rolled and make the values with the building blocks.



Model counting on from one of the amounts, starting with one value and counting on.

I have five blue blocks. To find the total, I need to add the three red blocks. 5... 6,7,8. There are eight blocks in total.

If lining up the blocks helps and sliding the red blocks over to join the blue blocks supports one to one matching and keeping track of the count, model this also.



**5 blue blocks... 6 7 8
5 blocks and 3 more is 8.**

If the children roll a zero (the altered 6 face), you could get the children to roll again or if they are ready, you could explore the idea of adding zero by either counting on from zero, which they have experience of, or counting on zero.

Further opportunities for practice, recall and broadening learning

Adults could:

- Provide a role play shop with multiple small groups of items to buy, for example, a fruit and vegetable shop. Children are allowed to buy up to 10 items. Encourage them to pick one set (e.g. 4 apples) and then another (e.g. six potatoes), finding the total by counting on.
- Have a circuit set up outside, for example, a short circuit for the bikes / scooters. One child completes a number of laps (up to five) and then another child completes some more, keeping track of the total by counting on. Once completed, make a note of the total and the parts completed by each child.
- Give the children four bean bags each and ask them to throw the bean bags into a hoop. Record how many made it into the hoop. This could be by writing the digit, drawing rectangles to represent the beanbags or using chalk tally marks on the ground. The children collect and re-throw the beanbags. Ask each child to add the number that landed in the hoop this time to the number from their first throw. Encourage them to do this by counting on, using their representation of how many landed in the hoop the first time to aid the count.

Step five

Counting on from either part makes the same whole

As in Step 4, provide two groups of objects with a total of ten or less. Encourage the children to count on from one group to find the total, lining up the objects if it helps.



There are seven oranges. To find the total, I need to add 2 pears to 7 oranges. 7... 8,9. There are 9 in total.

Does it matter which type of fruit we count on from? Let's check.



There are two pears. To find the total I need to add 7 oranges to two pears. 2... 3,4,5,6,7,8,9. There are still 9 in total.

Clarify that it doesn't matter which group you count on from; the total will be the same.

Provide the children with lots of opportunities to identify the parts and count on from one part to find the total (the whole) then count on from the other part, identifying that the whole stays the same.

There are and .

To find the total, I can add to .

...

If I add to , ...

The total stays the same.

Further opportunities for practice, recall and broadening learning

Adults could:

- Repeat some of the activities listed in the earlier steps but when the children have found the total using any strategy (subitising, counting all or counting on), ask them to find the total again starting with the other part first. Check that they recognise that the order of the parts doesn't matter when finding the total (the whole).

Finding the Whole and Missing Parts

HfL Learning Outcome
Through a deep understanding of numbers to 10, have automatic recall of number bonds to 5 and some bonds to 10 and compare amounts.
Early Learning Goal
Have a deep understanding of number to 10, including the composition of each number. Automatically recall number bonds up to 5 and some number bonds to 10, including double facts.
Key Concepts
This is the final sequence specifically about part, whole understanding and explores what to do when something is missing; initially the whole but moving on to working out a missing part. Different types of problems will be used to teach different strategies. This is the introduction of subtraction. Initially, the children will explore what a missing part could and couldn't be, drawing on the children's understanding of the size of numbers and recognising whether an answer is reasonable or not. The ability to spot the reasonableness of an answer is a key reasoning skill and also supports the development of estimating. Subitising is also used to identify the missing part; familiar patterns will be used so the children can see what is missing. When doing this, the children are spotting the difference between values. The focus moves on to finding a missing part. Problems are used to introduce and explore the different models of calculating the part that is missing. Counting on was introduced in the previous sequence and this strategy can be used when solving 'how many more...' missing part problems where the whole and one part are known. Next, the take away model is introduced; the problem starts with the whole and a part is given away so the children will be calculating 'how many left?' Finally, the difference model will be revisited when the whole and a part are compared – counting on may also be used to solve this type of problem.

Steps within the Learning Sequence
Step 1: Finding the missing whole Step 2: Missing part – what could it and what couldn't it be? Step 3: Subitising the missing part Step 4: Missing part – how many more? Step 5: Missing part – how many left? Step 6: Missing part – finding the difference
What this learning builds upon
Children are ready for this learning when they: • Subitise small amounts, saying how many are there without counting. • Count reliably to 10 and use the cardinal principle to say how many there are in the group. • Recognise the part, whole model and know that the parts make up the whole (from the previous two sequences). • Begin to make reasonable guesses of amounts when estimating. • Are familiar with known models such as the tens frame.
What this learning leads to
• Tackling worded problems, knowing that reading the problem and exploring what it is asking leads to a calculation they can solve • Understanding different models for subtraction, including taking away to find how many are left and finding the difference • Reasoning about possibility of answers, considering whether their answer is plausible, e.g. the two parts are likely to be smaller than the whole • Estimating to get a sense of what the answer is likely to be close to and also to check how plausible their answer is • Considering strategy choices, e.g. when to choose a counting on strategy, physical resources or pictorial images drawn

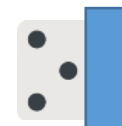
Behaviours pupils could demonstrate to show understanding

- Children will know that if the whole is missing, the parts need to be added together to calculate the whole.
- Children will be able to reason why an amount could or couldn't be the missing part considering the value of the whole.
- Children will be able to subitise a missing part by comparing a part and the whole.
- Children will use the language of parts and whole correctly to explain what is missing.
- Children will be able to use a variety of strategies to find a missing part.
- Children will recognise the parts and whole within a problem and identify what needs to be calculated.

Ways to check understanding

Children could:

- Be given small sets of items and be asked to find the total of two of the sets. Listen carefully to the strategy the children choose to use. Use questioning to see if the children are showing an understanding of the part, whole relationship – can they explain that when finding the total of two or more parts, they are calculating the whole?
- Have a familiar representation of five, such as a large printed dice image. Cover some of the representation. Can the children subitise the part that has been given and then work out the missing part?
- Be asked to identify what a missing part could be. Provide different possible amounts for the missing part and listen to the children's reasoning about why an amount could be the missing part or why it couldn't.
- Be provided with a range of different problems, presented orally, throughout provision that require them to calculate a missing part. Vary the question structure so that sometimes the problem requires them to calculate:
 - ✓ How many more...? If we need snack for four children and there are two bananas, how many more do we need?
 - ✓ How many left...? How many bikes are left now that Jonny and Zara are playing on those two bikes?
 - ✓ What is the difference...? You have made three play dough cakes and Meggie has made seven. What is the difference between the numbers of cakes you have made?
- Be carefully observed when presented with these problems. Watch and listen to the strategies they use to solve them and how easily they tackle the different types of problems.

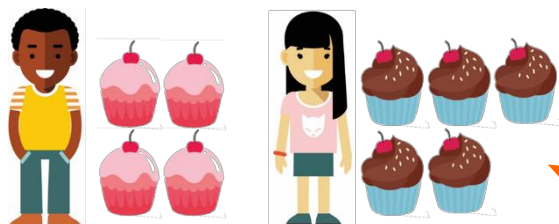


Step one

Finding the missing whole

In RLS11, many ways to find the whole were explored. In this step, the children can choose their strategy but the focus is on identifying the parts within the problems.

Set up a problem with the children. For example: Joe and Sarah have made cakes for a tea party. Joe has made 4 pink cherry buns and Sarah has made 5 chocolate cupcakes. How many cakes do they have in total? Puppets could be used to play the characters in the problem.



What do we know?

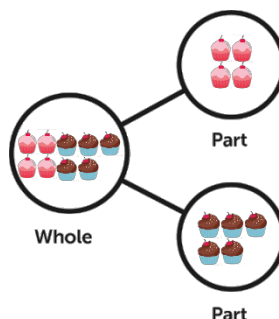
We know how many cakes Joe and Sarah have.

That's right. What do we need to find out?

How many cakes altogether.

Clarify that the parts are known and it is the whole that needs to be calculated. Share strategies on how the total number of cakes could be calculated, including subitising and counting on.

Show the children a part, whole model (handout RLS12_step1_part_whole_model) with toy cakes placed on it. Explain that the model shows Joe's and Sarah's cakes (the parts) and their cakes added together (the whole). Verbalise the calculation in context.



Joe's four cakes added to Sarah's 5 cakes makes 9 cakes altogether.

Further opportunities for practice, recall and broadening learning

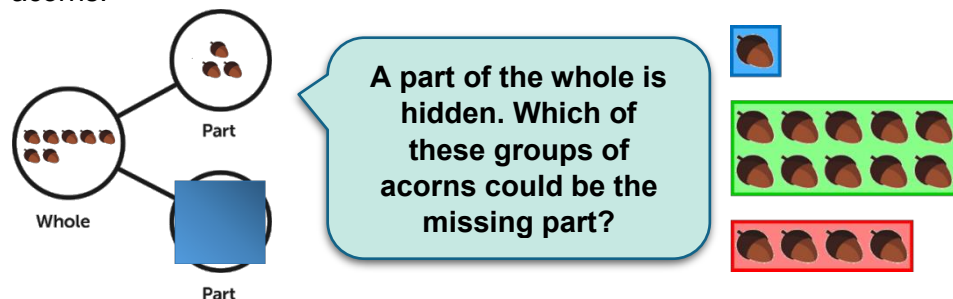
Adults could:

- Have a pet shop (or similar role play) with the different pets priced between 2p and 7p. Using pennies, encourage the children to come and buy two pets and calculate the total price. When appropriate, use the part, whole model to show the parts (the cost of each pet) and whole (the total price).
- Split small groups of resources (e.g. gardening equipment or paint) into two groups and express what has been done as a problem, e.g. "I have put 5 paint colours in this pallet and 3 colours in the other. How many colours are there altogether?"
- Challenge children to find the total number of bricks used when children are building multiple towers.

Step two

Missing part – what could it and what couldn't it be?

Show the children a part, whole model with real objects, for example acorns, where one of the parts is hidden. Also, show three groups of acorns.



The focus is not on the correct group but the likelihood of the chosen group being correct. The key teaching and learning is the explanation of the reasoning for their choice. This language will need to be modelled.

It can't be the green group it's too big.

That's right. It can't be the green group because there are more in that group than are in the whole.

It can't be one acorn; that would make four.

Are you saying that the part can't be one because you know the whole would then be four?

I think it is the red group of four. It looks about right.

You think four is the missing part because three and four look like they might make the whole; seven.

Provide more opportunities for the children to reason about what they think the missing part might be, focusing equally on why an amount can't be correct as much as why an amount could be correct.

Further opportunities for practice, recall and broadening learning

Adults could:

- Have a role play set up with elements missing, for example, a table set for dinner. Have a collection of the missing objects for the children to decide which collection is needed to complete the given group. For example, the table is set for 6 people. Three forks are on the table so provide: a fork, three forks and a pile of about ten forks. The children pick the group they think is best and provide reasons for their choice.
- Provide a picture made up of two shapes. Give children one of the shapes it is made up from and a selection of shapes the second shape could be. Children choose the shape they think is the missing one and provide reasons for their choice.



- Have shells (or a similar small object where there are lots) and a cupcake tray or tens frame. Have the tray / frame part-filled with one shell in each part. How many shells are needed to finish filling the tray? Have bowls with different amounts in (2, 5, 9) and see if the children can spot which amount is most likely to fill the tray and then check.



Step three

Subitising the missing part

Play Five Frame Flash:

- Show a five frame and clarify that when it is full, there are five in total.
- Have a five frame with some counters on.
- Show it to the children for a few seconds and then hide it.
- On one hand, ask the children to show the number of counters on the five frame and on the other hand, show the number needed to fill the frame to make five.



When playing the game, clarify that the whole (the five frame) and one part (the counters in the frame) is known and the missing part (the blank squares) is being calculated. This also rehearses bonds to five.

Provide other opportunities for the children to subitise a missing part. The whole and a part could be presented so the children can see the values (e.g. objects or pictures), aiding them to see the difference between the whole and the given part. Or, as below, the whole could be represented as a digit and one part shown with the other part hidden. Once the part has been calculated, the correct amount is revealed. For example:

Whole	Part	Part
		

Further opportunities for practice, recall and broadening learning

Adults could:

- Have some objects buried in the sand and have some on the surface. Tell the children how many items there are in total, ensuring that the total is a subitisable amount (up to 6 objects). Encourage children to subitise the number of objects they can see (not hidden) and use their knowledge to calculate the hidden amount. Find the hidden objects to check whether they were correct or not.
- Play Kim's game. Show the children a small collection of different objects on a tray and identify the whole (the total number of items). Hide them all and remove some objects. Reveal the objects left. The children must calculate how many have been taken – the missing part.
- Create parking spaces outside for the vehicles, e.g. using chalk on the ground. Have spaces marked for a few vehicles that have not been put out yet. Model the language and ask the children to calculate how many vehicles haven't been put out yet. "I can see 4 parking spaces but only 3 have bikes in. How many must be left in the shed?"

Step four

Missing part – how many more?

Show the children two fingers.



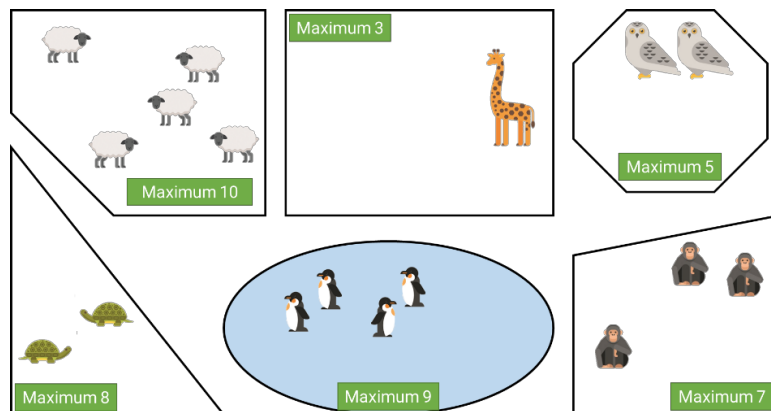
How many more fingers do I need to stand up to show five fingers?

Three more fingers.

2... 3, 4, 5. Three more.

Encourage the children to count on from the given amount (the part) to the target number of fingers (the whole). Clarify that the fingers that were up to start with were a part, the target is the whole and 'how many more fingers?' is the missing part. Rehearse this regularly.

Provide other opportunities where the children are given a starting amount (the part), a target to reach (the whole) and they find 'how many more...?' (the missing part). For example: when shopping, building towers or with animals in each part of the zoo.



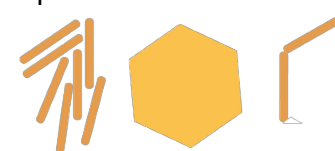
How many more penguins can we put in the pool?

There are four in the pool and it can have nine. 5,6,7,8,9 – you can add five more penguins.

Further opportunities for practice, recall and broadening learning

Adults could:

- Have different 2D shapes and lollypop sticks. Start to make a shape with lollypop sticks. Ask, "How many more lollypop sticks will we need to make the shape?"



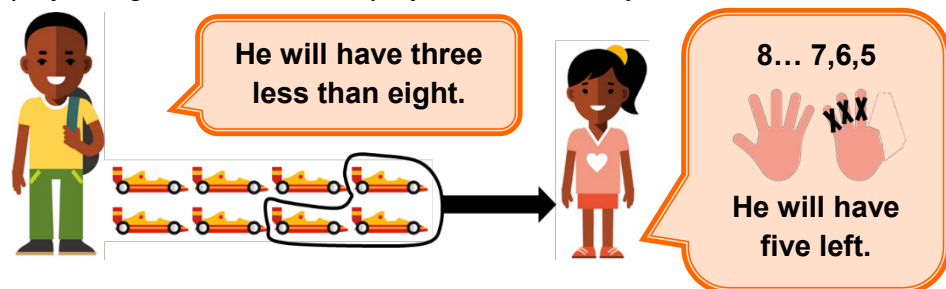
- Talk to children during track games (e.g. snakes and ladders) about 'how many more to... the head of a snake, the bottom of a ladder?'
- Question children when tidying about 'how many more...' until everything is away. For example: how many more bikes / scooters need to come back to fill the parking spaces?

Step five

Missing part – how many left?

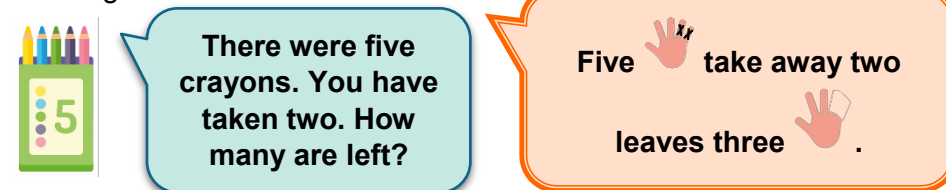
Show the children a problem using practical resources (and puppets if you wish).

Omar was playing with his toy cars. He had 8 cars. His sister came to play. He gave her 3 cars to play with. How many cars does he have left?



Model physically taking away 3 from the group of eight and also model counting back on fingers, putting down a finger for each car removed. Clarify that the number Omar had to start with was the whole, the cars he gave away is a part and what he is left with is the missing part which is being calculated.

Throughout provision, spot opportunities for children to calculate the missing part when something is taken away. For example, when fruit is taken from the snack table, when pens are taken from the pen pots or when wellies are taken of the rack. Always try and start with the whole – how many were there to start with – and recognise the part that has been taken. Encourage the children to use their fingers, either for subitising or counting back.



Further opportunities for practice, recall and broadening learning

Adults could:

- Notice opportunities throughout provision to ask children 'how many left...' questions. It is the talk around these problems that is important. Once the children have given an answer, echo it back including the whole context of the situation. For example, child: 'three'; adult: 'that's right. We started with six aprons. Three children have taken an apron so there are three aprons left.'
- Set up a shop with priced items and give children ten pennies to buy things. When they buy something, encourage them to work out how many pennies they have left.
- Label how many resources should be in the pot for items such as the scissors, glue sticks and felt tip pens. At the start, check that the correct amount are in the pot. When three children are using the scissors, ask how many should be left in the pot?

Step six

Missing part – finding the difference

This step is similar to step 3; the difference between the whole and a part are being compared. In step 2, the whole is a subitisable amount so the missing part can also be subitised. In this step, the difference between the whole and the given part may not be subitisable so the children will need to have strategies to identify the difference and then calculate it.

Show the children two strings of beads. These could be threaded by the children.

What do you notice about the difference in the number of beads?



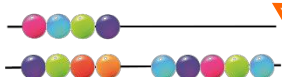
I can see four on the first one – the other has more beads.

Initially, the children may focus on differences between the beads (e.g. the colour or order of colours) instead of the number of the beads. Encourage them to compare the number of beads using comparative language (more, less, shorter, longer) and then count how many.

I can see four on the shorter one and 1,2,3,4,5,6,7,8,9 - there are 9 on the longer one.

That's right so we need to find the difference between 4 and 9.

Model identifying the beads that are the difference. These could be physically separated so the children know what to count.



1,2,3,4,5. The difference is 5.

So the difference between 4 and 9 is 5.

To 'find the difference', children will need lots of practical experience with the same objects so they can make physical comparisons by matching one to one and identifying the part that is the difference. When confident, children can find the difference between groups of different objects.

Further opportunities for practice, recall and broadening learning

Adults could:

- Play Tens Frame Flash – like Five Frame Flash in step 4 but with a tens frame. In this game, ask the children to find the difference between the number of counters on the frame and the full frame (ten).
- Provide a non-standard unit of measure, for example some cubes, when children are making play dough worms or sausages. Encourage the children to find the difference in the lengths of their worms / sausages using the unit of measure (the cubes). For a challenge, ask them to make two worms with a given difference in length, e.g. five cubes difference.
- Look for opportunities for children to calculate differences throughout provision, for example, finding the difference between:
 - the number of cows and the number of horses on the farm in small world play
 - the height of two towers in construction
 - the number of carriages on two trains
 - the number of bean bags thrown into hoops
 Ensure that the language of difference is used when questioning, talking to and echoing children's responses.

Ten and Some More

HfL Learning Outcome
Have a deep understanding of numbers to 10 and begin to count confidently beyond ten, recognising patterns in the counting system.
Early Learning Goal
Verbally count beyond 20, recognising the pattern of the counting system
Key Concepts
Understanding the numbers eleven to twenty is notoriously tricky; many children can learn to recite the numbers names to twenty in order and count sets of up to twenty objects but don't fully understand what the numbers mean. There are a number of reasons for this: - They are the first of the two-digit numbers so the children have to be able to interpret two digits when reading the number in numerals. - The names for the numbers in this decade don't follow the pattern within all the other decades to a hundred. - The way most of the numbers are read does not link to the order in which the digits are written. - To be fully understood, the creation of the 'unit of ten' from ten ones needs to be understood and then applied to interpreting the numbers eleven to nineteen – the foundations of place value. This sequence introduces the numbers eleven to twenty as 'ten and some more'. Using this vocabulary begins to link the numbers (in words and as digits) to the conceptual meaning. This is revisited again in Y1 and place value as a concept is not in the National Curriculum until Y2 when the children are ready for this learning. Patterns are easy to spot and follow when the numbers are written as digits but the number names can be unhelpful and may cause confusion. The most common misconception seen is where children reverse the digits when recording numbers, based on how the number name sounds, so thirteen written as 31. For this reason, these numbers are introduced as 'ten and some more' before being written and named. The number names are not formally taught until step five.

Steps within the Learning Sequence
Step 1: Relating the numbers zero – ten to benchmarks of 0, 5 and 10
Step 2: Finding ten – creating the unit of ten
Step 3: Making ten and some more
Step 4: Making ten and some more and writing them in digits
Step 5: Naming ten and some more
Step 6: Matching ten and some more, the number names and the number in digits
Step 7: Finding one more / one less than a given number

What this learning builds upon
Children are ready for this learning when they: - Are secure in counting to ten, including counting on from a given number - Can regroup numbers, knowing that all numbers (to ten) can be regrouped in different ways - Subitise larger numbers by recognising smaller values within them and combining them (conceptual subitising) - Have a secure understanding of one more and one less up to ten
What this learning leads to
- A developing understanding of the place value system - Using benchmarks to aid calculation strategies

Behaviours pupils could demonstrate to show understanding

- Children will know key benchmarks and other numbers' relationships to them.
- Children recognise that ten is different to the numbers zero to nine and begin to explain why.
- Children show an understanding that ten is written as 10 and the 0 digit is needed because a new unit has been created; it is one group of ten (1) and nothing more (0).
- Children begin to understand that ten starts a pattern that is repeated in our number system.
- Children understand that the numbers eleven to nineteen are ten and some more.

Ways to check understanding

Children could:

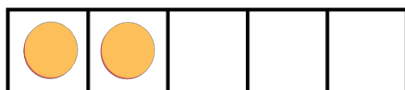
- Use the vocabulary of more and less to explain the numbers to ten and the relationship of each number to zero, five and ten. For example, three is three more than zero; it is two less than five and seven less than ten.
- Use familiar models, e.g. the fingers on both hands or a full tens frame, to identify ten and recognise ten instantly without counting.
- Count on from ten to find 'ten and more' when the unit of ten is identifiable.
- Read the numbers eleven to nineteen in digits and know that the one represents a ten and the other digit represents the 'some more' part.
- Relate the number names to ten and more, such as knowing that eleven means ten and one more.
- Use their knowledge of one more and one less within ten to help work out one more and one less for numbers eleven to twenty and refer to ten and some more.

Step one

Relating the numbers zero – ten to benchmarks of 0, 5 and 10

Start with a five frame. Clarify with the children that when it is empty, it represents zero and when it is full, it represents five.

How many
can you see?



Two

Using the vocabulary of more and less, ask the children to explain the relationship of the number shown to zero and five.

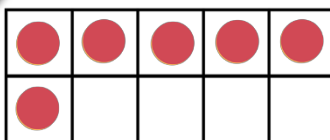
Two is two more than zero.

Two is three less than five.

Repeat with other amounts, including zero and five, until the children are confident.

Show a tens frame. Clarify that when it is empty, it is zero; when the top row is full, it represents five and when full, ten.

How many
can you see?



Six

How do you know?

The top row is
five and there is
one more - six.

Encourage the children to recognise the numbers six to nine as 'five and some more' and try and get them to visualise these numbers in this way. Having an internal *picture* of a number helps children develop a secure sense of these numbers. In addition to describing the numbers 6 to 9 as five and some more, also identify their relationship to zero and ten.

Six is six more than zero.

Six is four less than ten.

Repeat regularly to secure the numbers' relationships to the benchmarks zero, five and ten.

Further opportunities for practice, recall and broadening learning

Adults could:

- Question the children about amounts' relationships to the benchmarks zero, five and ten when counting or subitising groups of objects.
- Encourage the children to use five as a benchmark when identifying how many in a group, either by counting on from five or combining the groups to find the total. For example, when finding out how many apples there are on the snack table, find five and then identify how many more. So, if there are seven apples, identify five and two more.
- Provide groups of five or ten when setting up provision so children can use these to draw comparisons. For example, when setting up small world, have ten sheep in a field or make a train five carriages long.

Step two

Finding ten – creating the unit of ten

Ten is the first two digit number in our number system and the first to represent two things – one ten *and also* ten ones. This understanding that ten is a unit in its own right but that it can also be regrouped to make ten smaller units (ones) is a concept that will be developed and built on over a number of years. This step is an introduction to the concept.

Hold up all fingers and check that the children know that they have ten without counting them. Explain that ten is a very important and helpful number.



Have a pile of ten beads.

How many can you see?



Quite a lot - about nine or ten.

I think twelve.

Count the beads and clarify that there are ten individual beads. Thread the beads onto a pipe cleaner, checking all ten beads have been added.

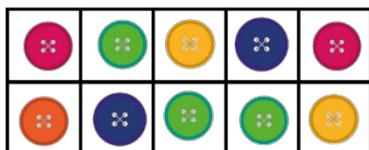


Now we know there are ten beads on here, will we need to count all the beads every time?

No, we know it's ten.

Yes, we have made a ten.

Show a tens frame with ten objects sticky tacked on.



How many buttons are there?

Ten because the tens frame is full.

Clarify that there are ten and we know that because we know a full tens frame is ten. There are no gaps. Unstick the buttons and check by counting that there are still ten.

Further opportunities for practice, recall and broadening learning

Adults could:

- Provide containers with ten sections, for example, adapted egg boxes or sweet trays, and clarify with the children that there are ten sections. Encourage them to recognise the ten when these containers are full.
- Play 'Make Ten'. The aim of the game is to complete more tens frames than your opponent.
 - Provide five tens frames (or draw five tens frames grids).
 - Player 1 rolls a dice and puts that number of counters on a single tens frame.
 - Player 2 rolls the dice. They can either put their number rolled in another tens frame or add them to the frame that Player 1 used but the number rolled cannot be split. For example, if Player 1 threw a six and Player 2 rolled a five, they can't go in the same frame because there would be more than ten.
 - Take turns rolling the dice, adding the amounts rolled to the tens frames.
 - A player wins a frame when it is completed exactly. For example, if there are eight counters in a frame and a player rolls a two, they can complete the frame. That player wins that tens frame.
 - The player that wins the most tens frames is the winner.

Step three

Making ten and some more

Ask a child to show all of their fingers. Clarify that there are ten. Next to the child's hands, show one more finger.



How many fingers does Izzy have?

Ten

How many am I holding up?

One

So altogether there is ten and one more.

If some children know that ten and one more is called eleven, that's fine but throughout the learning in this step, ensure that the children also describe the amounts made using the vocabulary 'ten and more'.

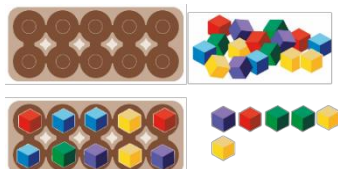
Show another familiar representation of ten and then some more; these could be the ones used in Step 2 or other familiar models such as Numicon® pieces or filled tens frames. Initially, ensure that the ten is grouped so the *ten* and some more is clear.



How many beads are there? Remember we put ten beads on the pipe cleaner.

There are ten and four more.

Once children are becoming more confident at recognising ten and some more, give them a set of objects to count. Provide a frame to help identify the *ten* within the count, for example, a tens frame or a box with ten compartments.



How many blocks are there?

I am going to put one in each section so... ten and six more.

Further opportunities for practice, recall and broadening learning

Adults could:

- Provide containers or frames (as in Step 2) so that when playing and recognising *how many*, the children identify the ten and can see how many more.
- Have groups of ten already created so that the children can use them to compare; initially, to help them recognise when they have more than ten but then to identify how many more. For example, have a pre-made tower of ten blocks and when building their own towers, encourage them to compare their towers to the tower of ten, constantly modelling the language of ten and more.
- Encourage children to use their fingers to find the ten, constantly reminding them that we don't need to count our fingers; there are ten.

Step four

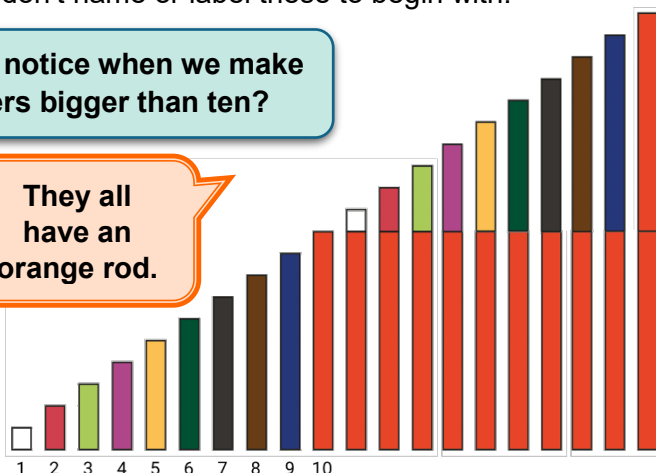
Making ten and some more and writing them in digits

Using Cuisenaire rods, ask the children to make a staircase - one to ten starting with the little white cube representing one. Write their values underneath in digits. Then extend the staircase making the number eleven to twenty but don't name or label these to begin with.

What do you notice when we make the numbers bigger than ten?

It's the same pattern. White, red, green...

They all have an orange rod.



Talk about the patterns that are seen and then name all the numbers using the vocabulary 'ten and more'.

Write the value of the numbers in digits from 11 to 20 below the rods and also below the numbers 1-10 and look for patterns.

1 2 3 4 5 6 7 8 9 10
11 12 13 14 15 16 17 18 19 20

What do you notice?

What do you think the 1 means?

I think it is the ten. So in 13 the 1 is the ten and the 3 is the three more.

It's the same except there is a 1 in front of the numbers.

Further opportunities for practice, recall and broadening learning

Adults could:

- Create a display within the environment showing the numbers to twenty as ten and some more using a proportional model (like the picture in Step 4). On this, record the numbers as ten and more and also add the number in digits.
- Write the 1 ten and ' more' digits in different colours when writing the numbers eleven to nineteen. The colours could match a familiar model such as the Cuisenaire or Numicon®. For example, **14**, **18**.
- Use the vocabulary of ten and more, highlighting which digit refers to which part, when reading the numbers eleven to nineteen from digits. So when reading 15, point to the 1 ('one ten') and then point to the 5 ('five more').



Step five

Naming ten and some more

Patterns within eleven to twenty are easy to spot when building the numbers and writing them in digits but the number names for this decade don't follow the pattern of the rest of the numbers beyond twenty to a hundred. Most children will be familiar with the number names but many may get some muddled, especially twelve and twenty, and some may mispronounce them and end them with 'ty' instead of 'teen'.

Spend some time looking at the number names and saying them out loud, listening carefully to how they are pronounced. There is no expectation that the children can read all the number names but they can look for similarities and differences between the words. Display the number names eleven to twenty.

What's the same and what's different?

Thirteen to nineteen end with 'teen'.

Ten
Eleven
Twelve
Thirteen
Fourteen
Fifteen
Sixteen
Seventeen
Eighteen
Nineteen
Twenty

Twelve and twenty both start with 'twe...'

In fourteen, sixteen, seventeen, eighteen and nineteen the number more than ten is said first.

Using the staircase created in Step 4, label the rods with the number names and link this to ten and some more, for example:

This is ten and seven more – seventeen.

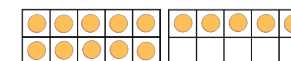


Further opportunities for practice, recall and broadening learning

Adults could:

- Provide opportunities for the children to practise counting to twenty, rehearsing the order of the numbers (the stable order principle).
- Add the number names to the display (as suggested in Step 4) so the numbers eleven to twenty are labelled as ten and more, written in digits and the number name.

Ten and five more 15 Fifteen



- Stop regularly to clarify the meaning of the number name when rehearsing counting. For example, when counting to twenty, stop once twelve has been said and check the children know that twelve is ten and two more. With a friend, they could make the number with their fingers with one child showing all their fingers for the ten and the other showing two more.
- Link the number name to the concept of ten and more whenever the numbers eleven to twenty are used throughout provision. For example, when counting out the snacks, "There are nineteen milks today. That is ten and nine more milks."

Step six

Matching ten and some more, the number names and the number in digits

Have the numbers eleven to twenty written in digits and in words on cards. Have groups of objects, between ten to twenty in each group, and a frame to support the identification of ten – a tens frame or a box as in Step 3. The children pick a group, estimate how many they think are going to be there and then count creating a group of ten and some more.



How many mini-beasts?

I think a few more than ten.

There are ten and two more.

Ten and two more is twelve.

Twelve **12** **12 is twelve.**

Two tens frames could be provided so that the children can organise the 'some more' numbers into a familiar pattern as well. This will encourage them to subitise the 'some more' therefore calculating the total.

Ten and eight more is eighteen.

I can see a full tens frame – ten – and five and three more which is eight.

Further opportunities for practice, recall and broadening learning

Adults could:

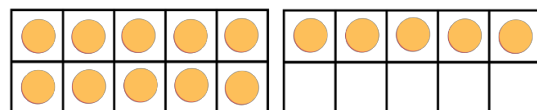
- Play games that involve matching a representation of the number, the number name, the number expressed as ten and more and the number in figures. This could be snap or memory pairs for example.
- Continue to link the number names and digit representation to the concept of ten and more whenever the number eleven to nineteen are talked about throughout provision. In addition, also encourage visualisation of the number, verbalising how the number could be made, for example, "I think of thirteen as a full tens frame and three more", or, "I see nineteen as two tens frames with one missing".
- Ask children to work in pairs. One child collects a set of small items, for example, stones, shells or gems, getting an amount between 10 and 20 but not telling their partner how many. Their partner has two tens frames ready and has to arrange the items in the tens frames and say the total as ten and more and as the number name. When they agree the amount, they can swap roles.

Step seven

Finding one more / one less than a given number

Finding one more and one less can be introduced once children have had lots of opportunities to rehearse counting to twenty, using the language of ten and $\square$ more and the number names, and when they are confident reading the numbers in digits. When rehearsing the count, always try to refer to an image of the number so they develop a secure visualisation of the size of the number. Games such as 'boomerang' or 'hiccup' – as explained in RLS9 Step 3 can be used when rehearsing.

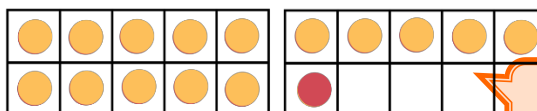
When introducing one more and one less to twenty, initially use the language of ten and $\square$ more and use models of the number, for example, made with counters on a tens frame.



How many?

Ten and five more - fifteen.

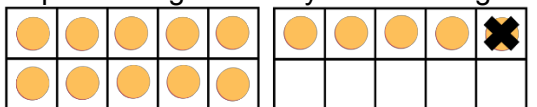
Add one more counter.



What has changed?

It is now ten and six more. One has been added.

Repeat taking one away from the original number – fifteen.



Fourteen – it is now ten and four more.

Children will need to revisit this lots of times in various contexts. Some children might be able to recall, from memory, numbers one more and one less. Observe this and be mindful that they could still be insecure with what the numbers mean.

Further opportunities for practice, recall and broadening learning

Adults could:

- Find one more and one less by physically adding one or taking away one from the set when counting larger groups throughout provision so that the children see the action. Remember to refer to both the number names and the vocabulary of ten and $\square$ more.
- Play track games, such as snakes and ladders, where a player moves along a track with a counter or small object. When the children are within the teen decade, talk to them about the next number or identify what number they would be on if they had to go back one space.
- Set up games where the children throw beanbags at marked areas showing one more or one less. Give the child a starting amount, such as fifteen, and a target to reach such as ten or twenty. They throw the beanbags at the marked areas, trying to get to their target number, keeping track of their score until they reach their target.



Doubling and Halving

HfL Learning Outcome

Explore and represent patterns within numbers up to 10, including doubling and halving

Early Learning Goal

Automatically recall number bonds up to 5 and some number bonds to 10, including double facts.

Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally.

Key Concepts

In the early years, it is crucial that we provide many opportunities for children to explore and identify regularities, sequencing and numerical patterns in mathematics. In this sequence, children will use the understanding of pattern gained in RLS4 to dig a little deeper in an exploration of numbers in patterns.

They will explore the language of doubling and halving as a means of identifying the unit of repeat in a pattern or the quantities of sets that are 'half as much' or 'twice as many' as each other. This will include representations of equal groups and repeated addition.

This sequence will emphasise the deep understanding of equivalence and equal value that underlies doubling and halving.

The children will continue to recognise the "unit of repetition" in the patterns (the beginning of multiplicative reasoning) as having a value in itself whilst being a part of a whole. It is important that the children continue to record their patterns in order to explore what is happening.

Steps within the Learning Sequence

- Step 1: Learning to identify equal and unequal groups
- Step 2: Identify doubles and halves (including the context of pattern)
- Step 3: Explore the relationship between doubles and halves
- Step 4: Establish part, whole understanding where the parts are equal

What this learning builds upon

Children are ready for this learning when they:

- Recognise many varied patterns within their experiences
- Understand it is the repetitive nature of something that makes it a pattern (this is unitising) from RLS4
- Understand that pattern can be found in many places such as dance, a song, threaded coloured beads or a staircase made from wooden blocks
- Identify the properties of the unit of repeat and will use it independently, for example to continue the pattern from RLS4
- Explore links between similar patterns

What this learning leads to

- Identifying rules and order
- Recognising the importance of the doubling and halving rule in varied structures in their lives and later, the links to multiplication and division through scaling
- Confidence in recognising and using patterns in calculation in later learning, for example, rules of adding odd and even numbers
- The beginnings of algebra

Behaviours pupils could demonstrate to show understanding

- Children will show interest and curiosity identifying equal and unequal sets all around them.
- Children will make decisions about what to use to complete and extend patterns accurately.
- Children will talk about and describe the patterns they come across by identifying equal and unequal groups; sets that are double or half of each other's quantity.
- Children will respond appropriately to questions and with accurate detail using the language of equal / unequal / double / twice as many and half.
- Children will show sustained engagement in completing patterns and groupings using their own ideas and self-selected materials.
- Children will learn to identify the known values as doubles or halves of each other within many contexts.
- Children will reason the choices they have made and explain their thinking in the context of doubles and halves.
- Children will show satisfaction at meeting their own goals and are proud of their achievements.
- Children will use their understanding of doubling and halving to solve problems set and create problems of their own for others to solve.
- Children will explain how they know when they have found doubles and halves and how they know when they have not by explaining what is the same and what is different.

Ways to check understanding

Children could:

- Double or halve the number of beads on the adult model of a necklace or twice the amount of pasta pieces in the pot using tweezers.
- Choose two containers they estimate to represent half and double the capacity of one another. They can then check their guess by weighing the sand or measuring the water used to fill the containers.
- Respond to adult instructions such as, "Can you double the number of milk cartons on the snack table please?" or, "We will only need half of the plates for the table today."
- Recognise the doubles and halves to be found in pairs (of gloves or socks on a washing line, for example).
- Choose two items labelled to show that they cost the same amount of money (e.g. a rubber and pencil for 4p each) and find the correct total amount of money to buy both items. They will do this by doubling the value of one item because one item is only half the amount they need.
- Independently set puzzles for others to solve where the doubles or halves are missing, possibly further exploring and developing some of the ideas above.
- Independently model an example of grouping that **cannot** demonstrate doubling or halving to "trick" you, explaining their choices with confidence.

Step one

Learning to identify equal and unequal groups

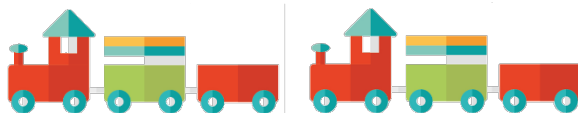
Begin with a collection of our “favourite things” and rehearse the children’s subitising skills by rolling a die to identify how many objects they can gather. The children choose their objects and count them onto their tray. The children then compare the sets of objects on their trays and find an equal set on another child’s tray if they can.

What do you notice about the groups of objects on your trays?

I have the same number of things on my tray as Sam. Our groups are equal.

I do not have the same number of things on my tray as James. Our groups are not equal.

Before the learning moves on further in the sequence, also revisit the learning in RLS4_Pattern Recognition (step 4) in order to interrogate recognisable patterns a little deeper and identify equal quantities within the context of pattern:



Oh yes. Will that carry on if we add to the train in the same pattern?

The number of green carriages is equal to the number of red carriages and the train engines.

Yes because there is one of each colour each time.

Further opportunities for practice, recall and broadening learning

Adults could:

- Begin a pattern sequence for the children to continue using a wide variety of objects and contexts. Notice what is in equal amounts within the pattern, e.g. there are always 2 sticks followed by 2 stones.
- Ask the children to create a pattern sequence of their own to challenge you to complete.
- Ask children to gather collections of their own in the outside environment, remembering to mix objects in the same set.
- Rephrase children’s comments in order to emphasise the equal and unequal groups seen in their collections and use key words such as equal and unequal or not equal.
- Use language to further develop a child’s understanding of equivalence and ask them to explain how they can prove it. E.g. how can we check that there are an equal number of dolls and dinosaurs?
- Provide a commentary alongside varied activities to model talk about equal values / unequal values and display thought processes that are appropriate to the context.
- Plan ways that invite children to make patterns for a purpose, e.g. a dance sequence for performance where equal numbers of jumps and hops may be used.
- Work alongside the children when they are creating patterns and talk about the decisions they are making.
- Encourage children to reflect upon patterns they have made, e.g. talk about the number of green gems compared to the red ones in an AAAABBBAAAABB... sequence.

Step two

Identify doubles and halves (including the context of pattern)

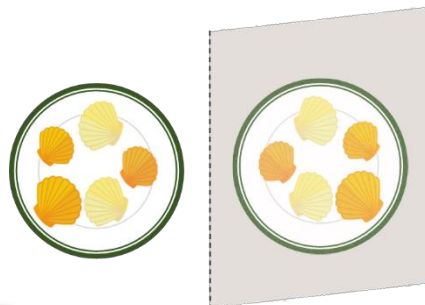
Ask the children to gather up to five items on a plate, e.g. shells. Count them carefully. Then use a mirror to show a reflection of their plate with the items on:

What do you see in the mirror?

I can see my things again.

So how many things are there on the plate in the mirror?

So how many things can you see altogether?



There must be five just like on my plate.

Ten things altogether. I can just double 5.

Take some time to establish that the total quantity is double the number of objects they found and that either plate, individually, is half of the total. This can be challenging because the reflected objects are difficult to touch for counting. Therefore this should be rehearsed several times, for example, in the painting or creative areas as well as gathering real objects in the indoor and outdoor environment.

Can you see both sets of 4 cars? I'm going to take away the yellow car from each set so how many are there altogether now?

There must be six altogether because I need to double 3 now.

Further opportunities for practice, recall and broadening learning

Adults could:

- Have (non-glass) mirrors available for children to explore making their own doubles within the environment within their play.
- Continue to deepen the learning of the children through pattern as described in the previous step. This time, include the specific language of doubles / doubling; halves / halving; twice as many / half as many in as many contexts as possible and in all learning zones.
- Teach the children how to play Dominoes; establish that the number of dots on the opposite sides of each brick must be **equal** when they touch and therefore will form a double. How many doubles can they find in a domino snake? (A line of dominoes). Then ask them to find the double dominoes (e.g. the double 3 domino) and to predict how many doubles there will be in a complete set of dominoes.
- Arrange eggs (or other objects) in different ways in different sized egg boxes (or muffin trays) and ask children to match the pattern. Point out that they have now doubled the number of eggs. Rearrange the eggs and ask if this is still a double (yes). Is it still a matching pattern? (No).
- Make a pattern and its double on a pegboard. Show the half and show the double. Ask children to create their own patterns.
- Ask the children to complete ladybirds and butterflies (opportunities for fine and gross motor control) to represent doubles and talk about 'two eights as the two halves' as well as 'eight and eight more', for example. Ask them to also make an example that is **not** a double and discuss how they know this.
- Halve a necklace string of beads which could be made into two bracelets. Sometimes the pattern is maintained and sometimes not. Are these still halves of the whole?

Step three

Explore the relationship between doubles and halves

Gather items similarly to the mirror activity seen in Step 2 and explore the relationship between the quantities further. We need to establish that the objects do not need to be identical for a quantity to be twice as many / half as many.

Let's play "Snap". I'm going to put these items on a plate. You can choose different items on your plate but there must be twice as many objects altogether.

Whilst the children gather their items, insist on the "twice as many" and "half as many" language'.

I have half the total number of items on my plate. How many do you have?

I have half as many as the total too because we have the same number of things on each plate.

Can you double the number of things on my plate please?

Yes. Here we are. Just have mine as well. Now you have twice as many as before.

Play a version of Race to 20 using two tens frames, a dotty (1 to 6) die and coloured counters. Children roll the die, double it and then place that number of counters onto the tens frame. The last throw needs to be the exact number needed to fill the frame. In order to identify this, the children will need to **halve** the number of spaces left. Insist on the use of specific vocabulary when playing and ask them to identify the number needed on the die (the half) and the number of counters needed (the double) for their last throw.

This player threw 3, 2, 2, 1 and 2 so when each amount was doubled, they needed 6, 4, 4, 2 and 4 counters.



Further opportunities for practice, recall and broadening learning

Adults could:

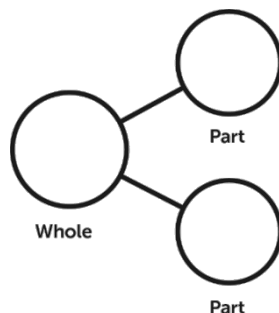
- Play Race to 20 and include halving as a choice in order to try to complete the tens frames first. As they get closer to the end of the game, they may find that halving the number thrown rather than doubling it will find the number of counters needed. This will also gently introduce the concept of odds and evens (to be addressed in the next sequence) when they throw an odd number.
- Ensure that the **quantities** of items gathered in any activity are the focus rather than any similarity or their size. Be sure to explore larger quantities and their doubles and halves using smaller objects such as pasta pieces, marbles and gems in mixed groups. Then compare these sets to a smaller quantity of larger objects. E.g. Double 4 construction trucks to make 8 trucks altogether. Then give a group of 12 items with 6 marbles and 6 dried peas. Which double is greater? What can they tell you about the halves? Sometimes the sets to be compared will be **heavier and lighter** than each other or **longer and shorter** than each other. Help children to understand that doubling and halving is used to compare quantities as well as to find totals. This will deepen their understanding of the conservation of number and number magnitude.
- Build towers, walls and other structures that are twice as tall or half as long etc.
- Play a barrier game in pairs or small groups where the adult places a number of items on a tray behind the screen and asks the children to double / halve that number on their trays. This challenges them to double and halve quantities they cannot see.
- Let the children play the barrier game independently and this time, when they reveal their double, they represent it as matching numbers using counters on tens frames. Can they find dominoes to match their doubles?

Step four

Establish part, whole understanding where the parts are equal

When the understanding is sufficiently secure, the representation of the children's learning should also include the part, whole models where the two equal parts are the halves and the whole is double the value of each half.

Play Supermarket Sweep. Ask the children to go "shopping" in the classroom to collect a given (even) number of items. When they return, the children will place their items in a P.E. hoop and count the total. Write this on a piece of card to leave in the 'whole' hoop. Ask the children to share their shopping items into two equal groups using the 'part' hoops. Model the language: our whole is 8 items so if we share it into two halves, there are 4 items in each part.



What do you see in the hoops?

Each hoop is equal so each hoop has half the toys.

Spend some time comparing the children's shopping groups. What happens when there is an odd number of items in the basket? Confirm that these sets of toys cannot be halved (shared equally into two parts). Give each child a purse or wallet and ask them to place a coin next to each item to represent its value. (This should be done using the coins that are familiar to the children already). Now place the accurate total of money needed in the original P.E. hoop to represent the whole.

What do we know?

These 2 hoops are equal and each hoop has half the money.

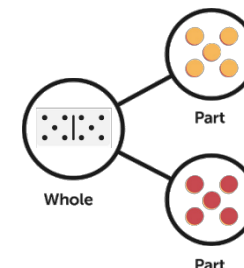
Do we know how much money we need?

Yes. 8p for each of these hoops and 16p altogether because double 8 is 16.

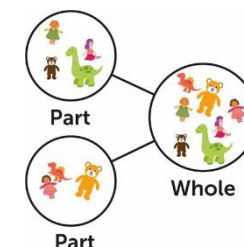
Further opportunities for practice, recall and broadening learning

Adults could:

- Explore the double dominoes as a representation of two halves and a whole using a part, whole model



- Continue to play with different values of money, doubling and halving amounts. Use different coins to represent equal values to further challenge the children.
- Set up a shop, labelling classroom items with prices. Ask the children to shop in pairs, starting with a total between them. They must spend exactly the same amount of money so they need to halve their total money first. They will return with different items. Compare their shopping baskets and model accurate language. Ask, "What is the same and what is different?" about the two sets of items.
- Ensure the learning is rich by including your own examples of incorrect division of items bought. Include examples of an odd number of items when they are ready as this will continue to lead them towards the next learning sequence.



- Represent any doubling or halving of objects as counters, pasta pieces, gems etc. in a part whole diagram before using a dot or a mark to represent each item in a drawn diagram.

Odd and Even

HfL Learning Outcome
To begin to understand the reasons why numbers and quantities can be described as odd or even.
Early Learning Goal
Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally.
Key Concepts
In this sequence, children will continue to explore numerical patterns in order to enrich their understanding of the number system. This builds upon the learning in the previous sequence (RLS14) and will provide further opportunities to explore known numbers and whether or not they are divisible by two. This will continue to deepen their understanding of equal and unequal groups. Further links will be made by asking children to group larger numbers into pairs (another approach to divide quantities by two) therefore building early foundations in their understanding of multiplication and division. Pattern seeking will provide opportunities for children to predict the properties of numbers outside their known range. The focus continues to be to build up their vocabulary to explain and describe patterns as they are beginning to generalise, make predictions and draw conclusions from a breadth of experiences.
Steps within the Learning Sequence
Step 1: Identify and recognise odd and even quantities by sharing into two groups Step 2: Recognise odd and even attributes in mathematical models Step 3: Explore the numerical pattern further in consecutive sequences of number

What this learning builds upon
Children are ready for this learning when they: • Begin to secure an understanding of equal and unequal groups • Share small quantities in varied contexts equally • Recognise and explain when the share is fair
What this learning leads to
• Identifying rules and order • Recognising the links to multiplication and division • Understanding remainders in division calculations • Sorting using mathematical criteria such as odd and even numbers • Confidence in recognising and using patterns in calculation in later learning • The beginnings of algebra

Behaviours children could demonstrate to show understanding

- Children will learn to identify values as odd or even within many contexts.
- Children will understand there is always one left over when sharing odd numbers into two equal groups.
- Children will identify the set objects belong to, using odd and even as the chosen attribute and explain their choice.
- Children will talk about and describe the patterns they come across by identifying odd and even groups.
- Children will respond appropriately to questions and with accurate detail using the language of odd / even and two equal / unequal groups.
- Children will show interest and curiosity in identifying equal and unequal sets all around them.
- Children will use their understanding of odds and evens to solve problems set and create problems of their own for others to solve.
- Children will explain how they know when they have found odds and evens by explaining what is the same and what is different.
- Children will subitise small numbers of objects in a set, stating whether the quantity is odd or even.

Ways to check understanding

Children could:

- Sort sets of items into pairs or two equal groups in order to identify whether the amount is odd or even. They should explain how they know, e.g. saying that if there is one left over after the pairs or equal groups, it shows that the amount is odd.
- Recognise that only even numbers can be sorted into pairs, e.g. of gloves or socks. Extend to discussing what we mean by “an odd sock”.
- Add to and take away objects from groups in order to make them odd or even.
- Describe what is different about odd and even quantities in a wide range of contexts.
- Identify familiar mathematical models as odd or even in value, such as counters on tens frames, Numicon®/number shapes or Lego®/studded bricks. Explore and group the resource into odd and even, e.g. with Numicon® pieces. Discuss what they notice about all the even ones compared to the odd ones. Children should continue to subitise where the values are small.
- Independently show when a set of objects **cannot** be an even quantity because they are not divisible by two, e.g. if they have 7 cars to share equally with a friend.
- Identify and explain the pattern of odds and evens in a sequence of consecutive numbers with varied starting points.
- Identify odd and even amounts of money (despite the many different ways that can be used to represent the totals), for example, 5p is an odd amount.
- Independently set puzzles for others to solve where the missing information must be identified as odd or even (similar to the problem solving in Step 3).

Step one

Identify and recognise odd and even quantities by sharing into two groups

Recap the learning from RLS14 and ask the children to gather a number of objects that they then divide into two equal groups. Remind the children that this is 'halving' the set. Some children will have gathered an even number of objects and others will have an odd quantity. At this point, interrogate the children's understanding of a "fair" share.

What do you notice about your two groups Henry?

I have two equal halves.



How about yours Oliver?

I can't make my groups equal. I have 4 in one group and 3 in the other

Let all the children identify their groups as fair or not. If nobody offers the vocabulary independently, introduce the words 'odd and even' to distinguish between the sets that were / were not divisible by two.

So what do we know about odd numbers?

We can't share them fairly into 2 groups.

Now ask the children to confirm whether the number of objects they have is odd or even before they arrange their sets again in pairs to identify a further link for divisibility by two. You may ask the children to predict the outcome.

What do you notice about your set now Oliver?

I have one left over because I have an odd number of things to share.

Further opportunities for practice, recall, broadening and deepening learning

Adults could:

- Ask children to identify odd and even quantities of different fruits at snack time.
- Ask children to gather and count pebbles, leaves and sticks etc. from the natural environment outside into their basket. Ask the children to explore whether they have gathered an odd or even amount.
- Ask children to identify which amounts of money are odd or even and check by dividing the money evenly between two purses / wallets. Consider starting with just 1p coins so that the children can check by making the 2 groups.
- Ask children to find odd and even examples in the tens frame cards on the handout and to sort them using this criterion.
- Ask children to build examples of odd and even representation on tens frames using counters.
- Provide a range of filled equipment that can be used to represent a number, such as muffin trays for 6, 9 or 12 muffins and egg boxes for 6, 12 or 15 eggs. Let the children predict and then explore if the cakes and eggs can be paired or divided into two groups.
- Provide a laundry basket of socks and gloves or a collection of shoes to be paired. When the items have been paired, the children can discuss whether the number of items is even or odd according to whether there is one left over or not.
- Ask two children to lay the table for different numbers of toy guests each time. How will they share the carrying of the plates and cups? Take the opportunity to link the halving / doubling and odds / evens learning here as they organise the task. With sufficient rehearsal, children will begin to predict the good numbers of guests for sharing the task equally.
- Take regular opportunities to ask the children to pair up for varied activities and ensure that the children are able to identify whether the number of children in the complete group is even or odd.

Step two

Recognising odd and even attributes in mathematical models

Ask the children to sort through the Numicon®/number shapes, Lego® or cubes which have been arranged into towers two blocks wide. Sort them into groups by how they look, leading children to notice the 'odd' one on top of the odd numbered arrangements.

How did you sort the pieces?



Some have a sticking up part and some don't.

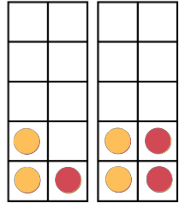
Which group represents the odd numbers?

The shapes with one sticking up on top.

As the children continue to explore, they will become more familiar with the idea that, when arranged in twos, even numbers are flat at the top because they share equally into two groups, where odd numbers do not. This will also deepen their understanding of division by two.

Using handout_RLS14_step2_tens_frames_odd_and_even, cut into cards, ask the children to build the amounts on their tens frame with counters.

Which tens frames show the even amounts?



Fully explore the similarities between all of the mathematical representations and identify the odds and evens in each.

With the cubes, Numicon® and tens frames, what do even numbers always have?

The even numbers have a flat top when they're in twos.

Further opportunities for practice, recall, broadening and deepening learning

Adults could:

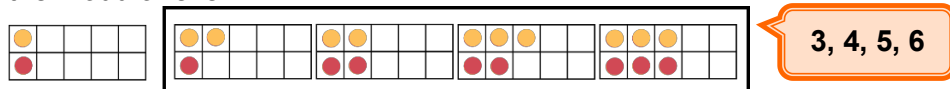
- Provide a selection of familiar models such as Numicon®/number shapes and Lego®/studded bricks in a "feely bag" and ask the children to hold and feel them without looking inside the bag. They must identify representations of odd and even numbers by touch and explain how they know.
- Ask the children to organise the chairs in two rows back-to-back for "musical chairs". What happens when the number of chairs is odd? Notice how when there are an odd number of chairs, one doesn't have another chair at the back.
- In small world, provide opportunities to sort things into areas, for example, in a dolls house. Use furniture to emphasise the odd and even quantities of people and pets living there. If the table is a square or rectangle, which numbers of chairs are easier / more difficult to arrange etc.
- Ask the children to represent their solutions to the small world and musical chair problems using a mathematical model such as a tens frame or Numicon®/number shape.
- Hold up a tens frame representing a different value each time and ask the children to arrange the chairs for musical chairs to match the tens frame.
- Repeat the task above in varied contexts using different mathematical models and emphasising the language of doubling / halving and odds / evens each time.
- Continue to link the learning when asking the children to make two teams to play any whole class game / P.E. activity etc.

Step three

Explore the numerical pattern further in consecutive sequences of number

Represent the counting sequence using varied representations of the values alongside the numerals and words. This could include objects and mathematical models that are now familiar to the children.

Make a frame and zoom in on a section of three or four numbers in the sequence. Ask the children to call out the values in order and then label them odd or even.



One, two, three, four, five, six, seven, eight . . .

What do you notice about the odd and even numbers?

Odd, even, odd, even

Well done. We call that an alternating pattern when you repeat one and then the other over and over again. What do you think you will see if I move the frame further up the line?

They make a pattern like one, two, one, two.

Maybe the pattern will change.

I think it will still be the same pattern.

Move the frame along the sequence several times, changing the starting numbers from odd to even. Confirm that it continues to be an alternating (odd, even, odd, even) pattern, wherever you count from and to.

Further opportunities for practice, recall, broadening and deepening learning

Adults could:

- Explore consecutive numbers and the odd / even pattern by asking children to make / collect each number in a short sequence e.g. from 3 to 7 using Numicon®, cubes, Lego® or ten frames and counters.
- Provide other scenarios and materials where the odd / even pattern in consecutive numbers could be made, e.g. with 1p coins, stones outside, pegs on a peg board. Encourage the two columns layout and looking for how they know a number is odd, checking that the number before and after are both even. E.g. if 5p is an odd amount, are 4p and 6p even? How could we check? Using a tens frame for layout may be helpful.
- When the children are secure that the pattern is consistent across number and measures (including money), deepen the reasoning. This time, the children could work without the frame used in the step to zoom in, but will need a number track to look at and should make their numbers with the resources available:



1	2	3	4	5	6	7	8	9	10
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- How many odd numbers are there between 2 and 8?
- Where else can you see this? (Children independently find another pair of numbers with 3 odd numbers between them).
- What will you do to find a pair of numbers with 2 odd numbers between them? Can you find lots of pairs? Can you tell me when you are finished and why?
- Ask the children to make a frame that would guide a friend to find pairs of numbers with 2, 3, 4 etc. odd/even numbers between them.

Counting Beyond 20

HfL Learning Outcome
Have a deep understanding of number to 20 and beyond and to count confidently and continue to recognise patterns in the counting system
Early Learning Goal
Verbally count beyond 20, recognising the pattern of the counting system
Key Concepts
In RLS6, we emphasised the connection between counting each object once and identifying a total. The rehearsal in this sequence will take the count beyond 20 for children who are ready. The children will also continue to use counting to compare quantities and find a precise difference, building on the skills and concepts taught in RLS6 and RLS7. With many opportunities for exploration, children will demonstrate their sense of number magnitude and will identify the parts and the whole with bigger numbers. This will provide an opportunity for the children to build upon the learning in RLS13 and their understanding of the importance of ten. This sequence should be seen as an extension of RLS13 to broaden and deepen the understanding of number and how to use counting in their mathematical understanding. Once again, it is important to establish the difference between rote counting (saying the sequence) and counting with understanding (being able to say how many objects there are in the group). This sequence will focus on the children's understanding that 20 is two tens as well as being one more than 19 and one less than 21. It will also review all the previous and important learning that underpins their understanding, such as number magnitude and the part, whole relationships when grouping higher numbers. It is not appropriate for children to learn formally about the place value system yet but there will be some recognition that digits make up numbers in the same way that letters make up words.

Steps within the Learning Sequence
Step 1: Using counting to identify amounts Step 2: Using counting to compare quantities and find a precise difference Step 3: Maintaining an understanding of number magnitude with numbers beyond 20 Step 4: Understanding that the pattern in consecutive numbers continues, using one more and one less Step 5: Regrouping to find the parts and the whole in numbers beyond 20 Step 6: Understanding the special grouping that organises collections into groups of ten

What this learning builds upon
Children are ready for this learning when they: • Have a deep understanding of number to ten • Understand the special nature of the benchmark 10 • Understand that in the teens decade (11-20), collections can be counted as 'ten and some more' with a ten and ones • Recognise and use patterns they know in the number system
What this learning leads to
• Understanding our number system more deeply, including the place value of each digit within 2-digit numbers • Counting larger amounts more efficiently, for example, by making groups of twos, fives or tens depending on what is being counted

Behaviours pupils could demonstrate to show understanding

- Children know key benchmarks and other numbers' relationships to them.
- Children understand that ten starts a pattern that is repeated in our number system.
- Children understand that collections can be counted in units of one and units of ten.
- Children understand that consecutive numbers continue to increase by one when counting forwards and decrease by one when counting backwards.
- Children can regroup a whole into multiple parts.
- Children recognise the whole, even when the set is mixed, and regroup it into parts.
- Children can explain their reasoning for the parts they create within the whole.
- Children will begin to choose effective counting strategies to find a difference.
- Children will use the patterns in consecutive numbers as clues to their value.
- Children will compare numbers efficiently by counting in units of tens and ones.
- Children will use comparison by quantity independently and with purpose.

Ways to check understanding

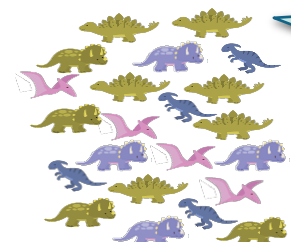
Children could:

- Give reasons for equal or different quantities when comparing in varied contexts. They should be creating groups for a purpose and indicating the reasons for the different sizes of each group.
- Count to check the differences or similarities they describe.
- Adapt their answers when different questions are asked or objects moved.
- Respond to challenging questions, comparing sets of objects that include numerical comparison, for example, "You have more shells than I do. I wonder if we can work out how many more?"
- Make use of the benchmark numbers with confidence when describing a difference between quantities as large or small, such as 19 is one less than 20, whereas 21 is one more than 20.
- Link the number names to the concept of groupings of 'tens and some more' – 23 means two tens and three more.
- Describe the patterns they see in consecutive numbers and their names, including the unusual differences in the teen decade, where thirteen (13) is three and ten, and fourteen (14) is four and ten.
- Describe the patterns they see in consecutive numbers and their names where the ten groupings are indicated by the decade names – 20 (two tens), 30 (three tens) etc. So 23 is two tens and three whereas 24 is two tens and four.
- Recognise the same value in different arrangements, counting the parts in any order to identify the same total.

Step one

Using counting to identify amounts

Offer a set of objects to count where there are more than 10.



How many dinosaurs are there? What will be the best way to count them?

We can put them in groups.

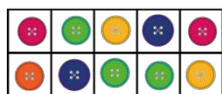
I think groups of ten.

Count up to 10 to make one group of dinosaurs and then continue the count 11, 12, 13... Stop here and ask what the children can see so far.

How many dinosaurs are there so far? Remember we put ten dinosaurs in this group.

There are 13. That's ten and three more.

When the children have shown they remember the ten and some more from RLS13, continue to count the complete set of dinosaurs. Repeat the grouping to demonstrate two groups of ten and two more. Rehearse the number names, numerals and words. Then ask the children to match the total number of dinosaurs with familiar groupings of ten.



How many boxes / tens frames will you need?

Use the models from RLS13 as the benchmarks for 10 such as the boxes with 10 compartments, tens frames and the fingers on two hands.

The opportunities for counting could continue to include objects that cannot be seen (dropping the items into a bag as they are counted), moving objects that cannot be touched and sounds that can only be heard, just as before. The children will be encouraged to group in familiar groups of ten as they continue to count and the adult will model that this is more efficient than returning to zero to check a total.

Further opportunities for practice, recall and broadening learning

Adults could:

- Provide regular opportunities to count and group objects within larger collections in all learning zones. For example, animals on a farm in fields of 10 or families of 10 in small world.
- Show the children they are dropping coins in a tin one at a time ensuring that the total number of coins is more than 20. Stop at 10 and place a tens frame in front of the children to represent that 10 have been counted. Continue the count and place another tens frame at the count of 20 and then count the final few. What is the total? Repeat this activity where the children are unable to see the coins being dropped in and must count what they hear.
- Ask children to group items in groups of 10 in order to count the total amount and use the tens frames playing cards to match the total counted: SNAP!
- Organise two teams of children to race each other to throw twenty-four bean bags into the tyres/hoops outside. Remember, a tyre is "full" when it has ten bean bags. Ask how many tyres they will need and use the opportunity to check no tyre has more than ten bean bags so that the two groups of ten are emphasised.
- Ask children to gather three different groups of items for a friend to see. They ask the friend to find their favourite group by providing a clue. For example, they make a representation of a matching total using the blocks in the boxes and the friend must identify the correct collection.



- Take the opportunity to count backwards to zero for each of these activities.

Step two

Using counting to compare quantities and find a precise difference

When the children are confident in counting to find bigger totals, they can compare their quantities by identifying the greater / smaller amount and how many more / fewer are in the collections. The language of comparison is integral to the exploration before adults begin to model the revision of previous learning to identify the precise difference.

Show the children two groups of mini-beasts and ask them to estimate which collection has the most.



Children will count to compare the quantities just as in RLS13; groups of ten will be used to identify the totals. Tens frames could be provided to encourage them to subitise the parts when counting up to the whole.



There are two tens and four more

There are twenty-four mini-beasts.

24

Repeat the exercise with a smaller group of 12 mini-beasts and ask the children to compare the two groups.

There are two full tens frames and four more in this group. There is one full tens frame and two more in this group. The difference is ten and two more. That's 12.

Further opportunities for practice, recall and broadening learning

Adults could:

- Organise two teams of children to race each other to throw bean bags into tyres / hoops outside. Remember a tyre is "full" when it has ten bean bags. Points are only scored when the bean bag lands within the tyre. The children must count and compare their totals to find the scores and then the precise difference. They could show the difference using their fingers.
- Set up a game with either two children or two teams of children where each child / team rolls a dice and then collects that number of objects (shells, cubes, dinosaurs). Repeat this several times. The children should keep count of their running total, practising counting on, placing their items in a line or on tens frames. After each round, check: Who has less / more? How many fewer / more? Identify the quantity they have found as the difference.
- Play pairs with the tens frame cards where the "pairs" are not matching but are two cards with a difference of five, for example, in their values. Encourage the children to count back to find a small difference rather than counting up to each total.
- Provide ways to 'measure' what children are making or comparing, such as small cubes, tens frames and counters, measuring tapes or strips of paper. Explore with children how they use counting to identify the difference in quantities or indicate how much shorter / longer / taller things are.
- Use the role play area theme to continue exploring similarities and differences, for example, in the food orders if it is a café role play. Ask the children to explain why the quantities are important. Do they use counting to check the differences in the customers' orders? Which will be the most expensive order?
- Place two toys on two different steps of a ladder so children can count the rungs to find a difference in the position of each toy.

Step three

Maintaining an understanding of number magnitude with numbers beyond 20

Remind the children of familiar models previously used to order numbers and compare their positions.



Extend the models beyond 20 and return to the language of RLS9, emphasising important benchmarks such as five, ten, fifteen and twenty. Use a strip of border roll to represent a blank number line.



Ask the children to place the numbers 5, 10, 15 and 20 in a sensible place on the number line. Shuffle cards with mixed representations of values and ask the children to place them on the number line comparing them to the benchmarks they have placed on the line.



This will go on the 10 near the middle.



This is closer to the 10 than the 20.



This will go on the 20 near the end.

Further opportunities for practice, recall and broadening learning

Adults could:

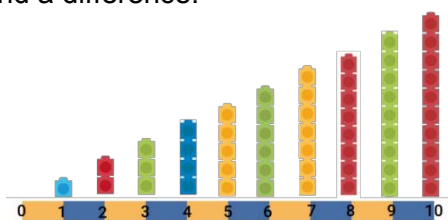
- Add 15 and 20 as important benchmarks to the class number line in the environment at child height. This could be horizontal or vertical and should have a variety of different representations, e.g. the numeral alongside dots or images. The benchmark numbers might have an extra symbol (e.g. arrow) to show their importance and should all look the same (5, 10, 15 and 20).
- When children are using the construction materials (e.g. building blocks), ask them about what they are building, e.g. "How tall is that wall? Is it nearly 20 bricks tall?" The child might count how many bricks high and go on to identify the nearest benchmark.
- Aid children's understanding of the magnitude of numbers to 20+ by playing a simple game. Have a number line ready. The children start with a counter on 0, roll a die and count on the number shown. It is important that the children start the count from the number they are on and count on. Points are scored for the nearest to 5 after the first throw, nearest to 10 after the second throw etc. Double points are scored for any player who lands exactly on a benchmark number. Encourage the talk about the distance to the nearest benchmark after each throw. This should include numbers that come after the benchmark but are still closer to the value, e.g. 16 is closer to 15 than 13 is. Count back to check as well as counting forwards in this game.
- Have two sets of items (between 10 and 30 of each) in clear containers e.g. conkers and gems. Encourage the children to estimate how many there are of each and compare totals. Which one looks closer to about 15; the conkers or the gems? Then take out the items, count both amounts and compare the totals.
- Label the storage units with quantities to be checked at tidying up time.

Step four

Understanding that the pattern in consecutive numbers continues, using one more and one less

Return to the staircase patterns, comparing the vertical (towers) and horizontal (number line) representations from the previous step and RLS9. Extend these up into the teen numbers and beyond.

Encourage the children to continue rehearsing and exploring the “one more” pattern in consecutive numbers before using that knowledge to find a difference.



Rehearse ‘one more’ and ‘one less’ with ‘greater’, ‘more’, ‘less’ and ‘fewer’ to secure this with teen numbers.

Let the children find differences of 2 and 3 more / fewer by comparing the towers in the staircase. “What is 3 more than 12?”

Tell the children you are thinking of a number and their job is to guess which number it is.

One more than is .

One less than is .

is one more than .

is one less than .

It could be 15.

My number comes after the green tower of 9 blocks. What could it be?

Is it 21?

My number is more than 15.

My number is 3 fewer than 21.

Each time the children use the towers to show their guesses and they count forwards and backwards as the clues are gradually revealed.

Further opportunities for practice, recall and broadening learning

Adults could:

- Place a toy at one value on the number line and another toy at a different value. Do the children count on to find a difference knowing that it is one more for each step? Move the toys to two different starting points but keep the difference between the values constant. What do they notice?
- Provide opportunities for a number hunt. The children have a representation of a number and they hunt for examples of collections for “one less” than that number etc.
- Invite extra guests to the café. The children prepare the extra cutlery, crockery and chairs.
- Continue to provide regular opportunities to rehearse the stable order principle with numbers to twenty and more, counting forwards and backwards.
- Count the milk cartons for snack time to match the number needed, grouping in tens to make the checking easier.
- Compare groupings in the class farm model, for example, using the language of more, less, fewer and indicate how many more / less / fewer each time. Order the groups of animals by their totals and identify any missing numbers in between.
- Ask children to count different pieces of equipment in the outside learning environment. Use a number track on the floor to place each group on the correct number to match the total of their items. Use this opportunity to rehearse the language of comparison and the pattern in consecutive numbers.
- Muddle the order of a sequence of consecutive numbers represented by their value and ask the children to order them correctly. Ask the children to shut their eyes whilst the adult hides two or three of the values. Can the children build a model to represent the missing numbers?

Step five

Regrouping to find the parts and the whole in numbers beyond 20

Let the children regroup as they have before (in RLS11) and focus on them counting on from a part to find the whole rather than counting all. Continue to use subitising (up to 6) as another tool.

2	4	8	16
5	1	13	7
14	3	6	10
0	9	15	20

Ask the children to choose two numbers secretly from the grid and to make two separate collections to represent each of their numbers without telling anybody what they chose. Children guess each other's secret numbers by counting the two sets. These become the two parts of the whole. The children then count on to find the whole.

**You have 12 books and 7 balls.
Your two parts are 12 and 7.**



The whole is .

I can see and within the whole.

The whole has been regrouped into parts.

Altogether, the parts of and make the whole, which is .

Continue to make several collections in this way. Consider whether different groupings can combine to the same total.

Use the speaking frame shown (taken from RLS11). Explore different ways of grouping larger numbers and begin to find groupings they prefer and talk about why that is. Continue to support with tens frames and start to talk about 'two tens and some more' when the total is greater than 20.

The children are now ready to hide one of the parts or the whole to fully explore the relationship and identify the missing information.

Further opportunities for practice, recall and broadening learning

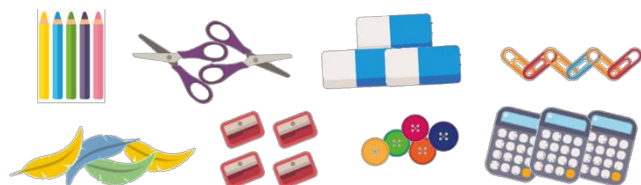
Adults could:

- Provide some toys in a toy box along with some toys not in the box that are hidden in *two* different places. Tell the children there are two groups to find and then count the toys in each group, including those in the box. Identify that the total number of toys (the whole) is made from the three separate parts. Encourage the children to count on and keep a running total as they count. Do they understand they could start with any of the groups and the total would be the same?
- Identify the total number of toys in the box and then hide some. "We know there should be 26 toys in the box. How can you find out how many I hid? Remember to reinforce the whole (26) and the two parts.
- Sort the children's names into three groups – school dinners, packed lunches and absent children – several times a week and use the language of parts and wholes.
- Provide opportunities in the role play area to group and regroup items for a purpose:
 - ✓ Lay the table and change the guest numbers
 - ✓ Prepare and organise the items for sale in the class shop
 - ✓ Select vegetables / fruit from a shopping list and identify the different prices as different parts and the final cost as the whole
- Gather equipment for junk modelling and use the language of parts and the whole when describing the component parts.
- Use natural items in the outdoor learning environment to create a pattern, e.g. sticks, pebbles and leaves in an ABAC pattern. Whilst describing and explaining the pattern, the children could describe the parts and the whole in their sequence. Which is there more of; the sticks, pebbles or leaves? If the unit of repeat changes, the groups will change. Can the children predict when they will need less or more of each?

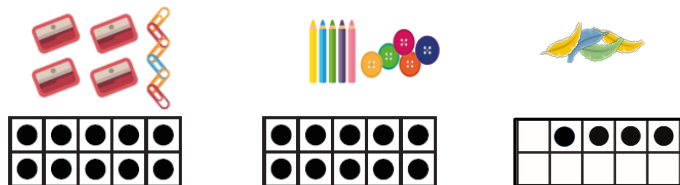
Step six

Understanding the special grouping that organises collections into groups of ten

In this step, children further explore grouping into tens to start to make their counting and calculating more efficient. Use tens frames and several collections of small items where two amounts would combine to make ten, for example, 4 pencil sharpeners and 6 paperclips.



Ask the children to group the collections, making tens, before counting the total. Match the sets with tens frames when they have been grouped in tens.



What can you tell me about your parts and your whole?

These two are groups of 10 and this is 4.

So you have three parts. Can we use these to find the whole?

Yes. One ten, two tens and four more.

That's right, one ten, that's ten, two tens, that's 20 and 1,2,3,4 more is 24 altogether.

Yes. 24 is my whole.

Further opportunities for practice, recall and broadening learning

Adults could:

- Use mathematical models and manipulatives to represent and explore the importance of 10 and use the language of tens as a special way of grouping.
- Introduce the groups of ten as another point of comparison, e.g. two tens will be greater than '10 and 3 more'.
- Organise equipment around the classroom in groups of ten, e.g. 10 pencils in each labelled pot at clearing up time.
- Emphasise the benchmarks on the class number line as 'one ten' (10) and 'two tens' (20).
- Count the snacks for the class and ask the children to show the matching value using Cuisenaire rods / tens frames cards.
- Organise crafting activities that emphasise the tens, e.g.
 - ✓ Paper weaving used to represent the scales on a fish – ten strips per fish
 - ✓ Make your own dream catcher – ten feathers for each
 - ✓ Pasta butterflies – ten per garden
 - ✓ Use cereal boxes and coloured paper to make monster feet – ten toes per foot
 - ✓ Cut out and decorate tropical fish and cut off the front of a box to act as tank – ten fish per aquarium

