

Want Ask Good Projects Every Hard
 day People Keep Fun Fractions work Art go
 outside Times Teacher problems Add time Numbers one
 trying story Problem Challenging solving around model
 Pattern Odd important Great Talk Science tables Take
 Subtract Interesting away writing Exciting Like Patient Fair Dice
 Success Together Help Reason Give Explain
 Maths

The Russell School

EYFS Maths Calculation Policy



Updated: February 2016



About Our Calculation Policy

This document is written for all adults working with our pupils; including teachers, teaching assistants, students, supply teachers and parents. It should be part of an induction package for all staff with inset as appropriate.

Our Early Years Calculation Policy has been devised to meet the requirements of the Statutory Framework for the Early Years Foundation Stage but most importantly the learning needs of our children at the Russell. The policy has been designed to give pupils a consistent and smooth progression of learning calculations across the school. Teachers should refer to this policy in all planning for calculations including cross curricular links.

The NCTM (National Council of Teachers of Mathematics) states: "Young learners' future understanding of mathematics requires an early foundation based on a high-quality, challenging, and accessible mathematics education. Young children in every setting should experience mathematics through effective, research-based curricula and teaching practices. Such practices in turn require that teachers have the support of policies and resources that enable them to succeed in this challenging and important work."

They go on to highlight how early maths can support the aims of the new Curriculum 2014: "Early childhood educators should actively introduce mathematical concepts, methods, and language through a variety of appropriate experiences. Teachers should guide children in seeing connections of ideas within mathematics as well as with other subjects, developing their mathematical knowledge throughout the day and across the curriculum. They must encourage children to communicate, explaining their thinking as they interact with important mathematics in deep and sustained ways."

One of our fundamental mathematical Key principles; that this policy has been derived from, is the assumption that children use the language of maths correctly, so that children can develop mathematical concepts and also allows teachers to address misconceptions early and ensure that children have a firm understanding of key mathematical concepts before moving on.

It is vital that children are taught according to the 'stage' that they are working at, the transition between stages should not be hurried as not all children will be ready to move on to the next stage at the same time. Throughout this policy stages have been developed which introduces new concepts, outlines appropriate manipulatives and visual models, and what mathematical language is involved for a particular concept. Latter stages are for those children who are showing to have 'mastered' a concept, allowing them to apply their learning in a real life context further deepening their understanding. The new curriculum focuses on skills and mastery and is not about moving children on to the next method as soon as they can do the one before.

Strategies for calculation need to be supported by familiar models and methods to reinforce understanding, such as the whole part model which children are exposed to throughout this policy. It is important for children to handle manipulatives to develop and reinforce understanding at all stages from Foundation to Year Six. A sound understanding of the number system and the value of a given number (place value) is essential for children to carry out calculations efficiently and accurately. Efficiency in calculation requires having a variety of mental strategies, which are carefully taught at a particular stage in a child's learning.

Children need to be taught and encouraged to communicate their reasoning and thinking at all stages. Confidence in their ability in mathematics and calculations should be encouraged and supported with all children, fostering a 'can do' attitude. The long term aim is for our children to be able to select an efficient method of their own choice asking systematically:

Can I do this in my head?

Can I do this using drawings or jottings?

Do I need to use a pencil and paper procedure?

What resources could I use to help me?

A Malin

February 2016

Reception

Children in Reception will begin to count reliably with numbers from one to 20, place them in order and say which number is one more or one less than a given number. Pupils will be able to use objects to add and subtract two single-digit numbers and count on or back to find the answer.

By the end of Reception children will be able to solve problems, including doubling, halving and sharing and begin to solve practical problems that involve combining groups of 2, 5 or 10, or sharing into equal groups. Children will be confident to estimate a number of objects and check quantities by counting up to 20 and will begin to count, read and write numbers to 50 in numerals.

Key Vocabulary: add, more than, and, make, sum, total, altogether, equal, one more, two more, five more, ten more, take away, left over, less than, lots of, double, multiply, sharing, divide, groups of.

Number - Number and place value

Count, read and write numbers from 1 to 10 in numerals and words.
 Given a number, identify one more and one less to 20.
 Compare and order numbers to at least 20 (from different starting points).

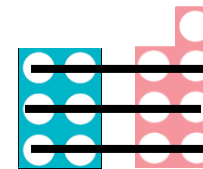
What is **one more** than 6?

Stage 1



I started with 6 beads, I added **one more**, now I have 7 beads.

Stage 2



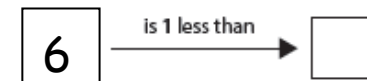
I can see using the Numicon that 7 is **one more** than 6.



Record using pictures or objects to develop understanding of mathematical language.

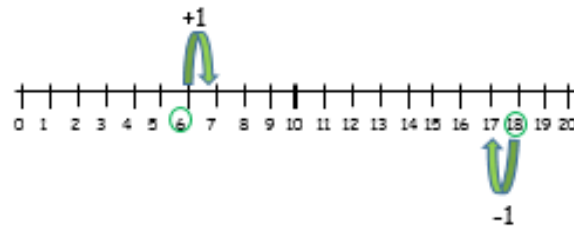
Use Numicon alongside beadstring to support mathematical process.

Record as process:



What is **one more** than 6?
 Complete 18, , 16, 15, ,

Stage 3



Use a number line to support mathematical reasoning and understanding.

18 take away 1 is equal to 17.

Record as process:



I started at 6 and added **one more**. That equals 7.

Number - Addition (The process of counting on from an amount to find the total)

Understand addition as combining two or more groups of objects.
Represent and use number bonds within 10.

What is 8 plus 2?

Stage 1
Introducing the concept of addition as finding the total of two or more sets.



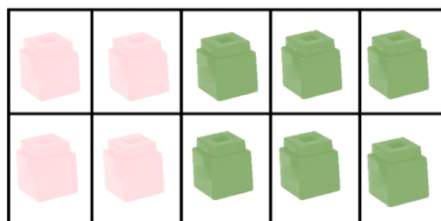
8 toys and 2 more toys equals 10.

I can see that you have made 10 using 8 green toys and 2 pink toys. Is there another way of using the toys to make 10?

Record using pictures or objects to develop understanding of mathematical language.

Stage 2
Investigating bonds within 10 using a ten frame

The **whole** is 10, and the **parts** are 6 and 4.

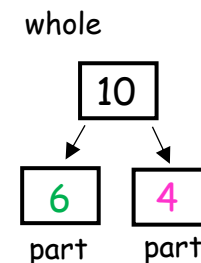


How else could you make a whole of 10?

Use Numicon alongside a beadstring and a ten frame to support understanding of number value and support mathematical language.

Stage 3
Investigating bonds within 10 using whole part model

The **whole** is 10, and the **parts** are 6 and 4. 6 add 4 equals 10 and 4 add 6 equals 10.



Use whole part model alongside a ten frame to develop mathematical reasoning.

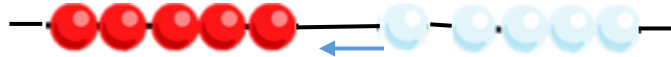
Understand addition as counting on.
 Add one-digit and two-digit numbers to 10, including zero.

Stage 1

What is 1 more than 5?



5 and 1 equals 6



Use Numicon alongside a bead string and counters to develop understanding of mathematical process.

1 add 5 equals 6 and 6 add 1 equals 6.

Stage 2



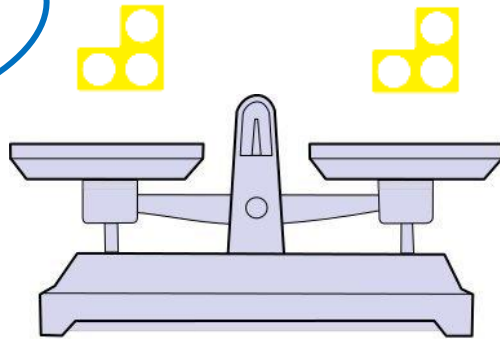
0+10 1+9 2+8 3+7 4+6 5+5 6+4 7+3 8+2 9+1 10+0

Use a ten frame and whole part model alongside Numicon to develop understanding of addition.

Recall doubles of all numbers to 6.

3 friends are at a party, they then each invite another friend to join them. How many friends are at the party now?

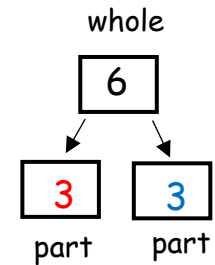
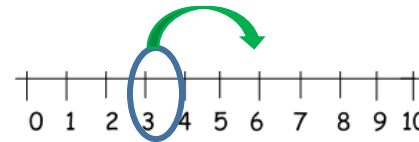
Stage 1



Use cubes and a balance scale alongside Numicon develop understanding of mathematical process.

Double 3 equals 6.

Stage 2



Record using whole part model moving onto written equation once children have an understanding of repeated addition. Support using a number line.

$$3 + 3 = 6$$

Read, write and interpret mathematical statements involving addition (+) and equals (=) signs.

David eats 3 apples and then eats 2 more. How many apples does he eat?

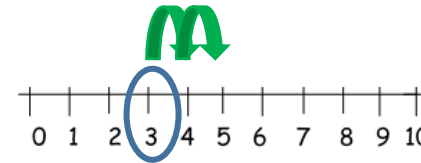
Stage 1



3 and 2 is the same as 5.
2 and 3 is the same as 5.

Stage 2

Once children have a concept of equals and are able to correctly form number sentences as outlined in stage 1.



5 is 2 more than 3

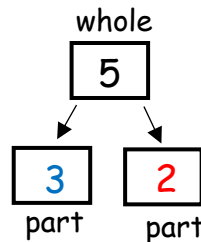
Provide opportunities to develop understanding of mathematical language while interacting with a range of resources.

Encourage children to say number sentences in different ways.
Record addition in pictures and words.

Children to use a number line alongside Numicon to develop mathematical language and understanding.

The whole is 5 and the parts are 3 and 2.

Stage 3



3 add 2 is equal to 5.
2 add 3 is equal to 5.

Children to use whole part model alongside a number line to construct equations.
Record as an addition fact family.

$$\begin{array}{l} 3 + 2 = 5 \quad 2 + 3 = 5 \\ 5 = 3 + 2 \quad 5 = 2 + 3 \end{array}$$

Number - Subtraction (The process of taking away from one set and counting how many are left)

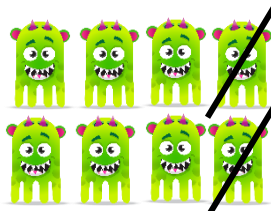
Understand subtraction as 'taking away' or counting back to find out how many are left.

Subtract one-digit numbers up to 10.

How many are left if 2 are taken away?

Stage 1

Introducing the concept of subtraction as taking away an amount and counting how many are left



8 take away two leaves 6.
6 is equal to 8 subtract 2.

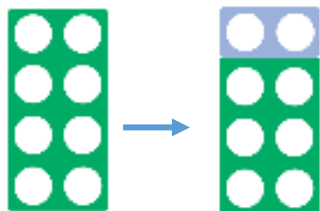
Record using pictures or objects to develop understanding of mathematical language.

Stage 2

Introducing the term 'difference'

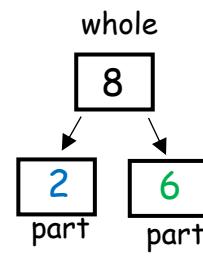
Children to place one Numicon tile on top of another to compare/ see the difference between two values.

The whole is 8 and the parts are 6 and 2.



The difference between 8 and 2 is 6.
The difference between 8 and 2 is 6.

Stage 3



Use whole part model to develop mathematical language and reasoning.

Record as a subtraction equation.

$$8 - 2 = 6 \quad 8 - 6 = 2$$

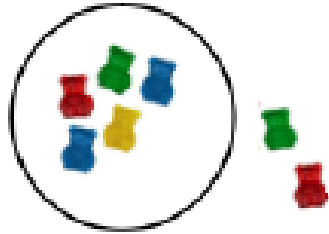
$$8 = 2 + 6 \quad 8 = 6 + 2$$

Use Numicon alongside a beadstring and a ten frame to support understanding of number value.
Record using whole part model.

Read, write and interpret mathematical statements involving subtraction (-) and equals (=) signs.

7 friends are at the party, then 2 friends leave. How many friends are left?

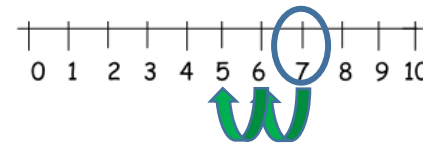
Stage 1



7 take away 2 leaves 5.
7 take away 5 leaves 2.

Stage 2

Once children have a concept of equals and are able to correctly form number sentences as outlined in stage 1.



5 is 2 less than 7.
5 is 2 more than 3

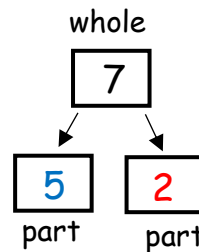
Provide opportunities to develop understanding of mathematical language while interacting with a range of resources.

Children to use a number line alongside Numicon to develop mathematical language and understanding.

Encourage children to say number sentences in different ways.
Record subtraction in pictures and words.

The whole is 7 and the parts are 5 and 2.

Stage 3



7 take away 5 is equal to 2.
7 take away 2 is equal to 5.

Children to use whole part model alongside a number line to construct equations.
Record as a subtraction fact family.

$$7 - 2 = 5 \quad 7 - 5 = 2$$

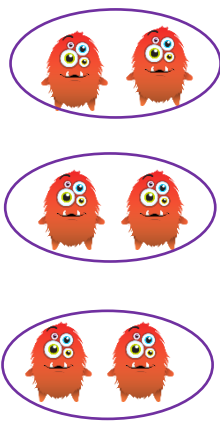
$$7 = 2 + 5 \quad 7 = 5 + 2$$

Number - Multiplication (The process of grouping items into equal groups and counting on/back using repeated addition/subtraction)

Understand the link between multiplication and doubling.

There are 3 toy boxes with 2 toys in each, how many toys are there altogether?

Stage 1

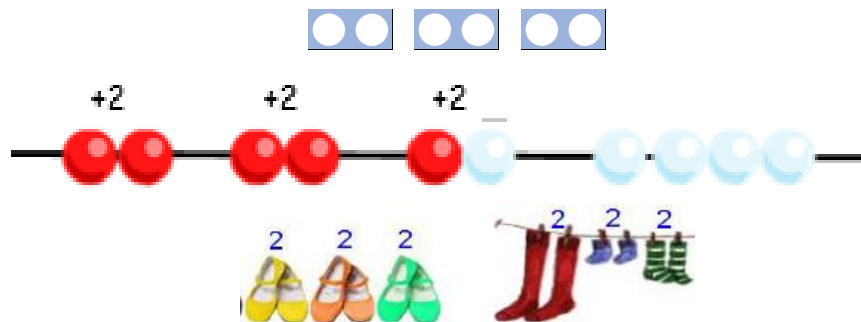


3 groups of 2 equals 6.

Grouping objects into equal sets and record using a picture to develop mathematical understanding and language. Record as a picture or drawing around Numicon.

Stage 2

Children should continue to understand the concept of doubling in a real life context.



Use a number line alongside a beadstring and Numicon to count on using repeated addition/subtraction developing mathematical process and language.

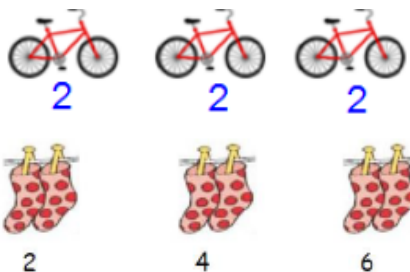
Record by drawing.



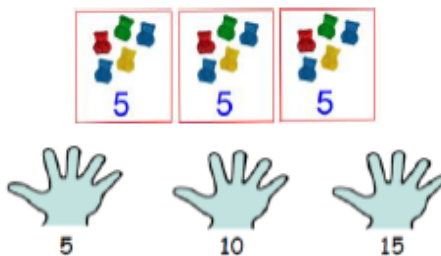
3 lots of 2 is equal to 6.

Understand multiplication through grouping small quantities.

Grouping in twos

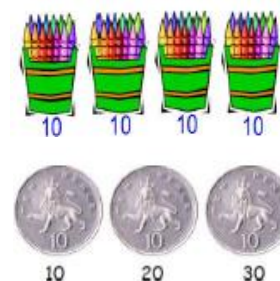


Grouping in fives



3 lots of 5 is equal to 15.

Grouping in tens

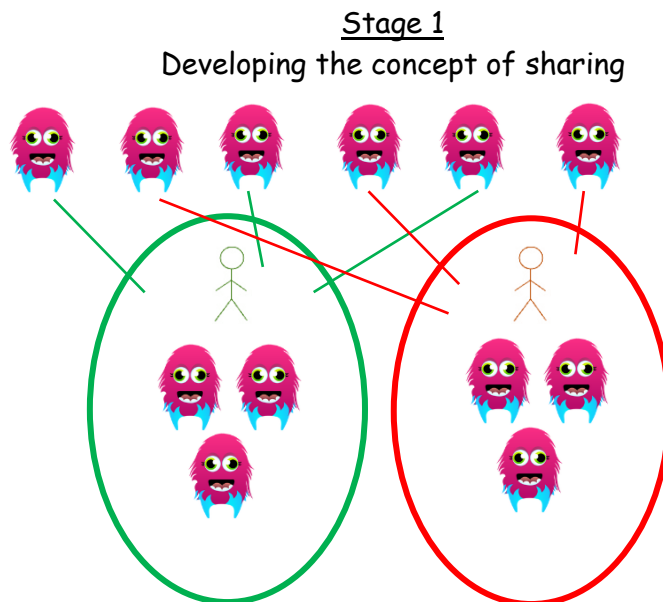


Children should continue to understand the concept of multiplication using practical equipment in a real life context using repeated addition. Record as a picture by grouping objects into equal sets to develop mathematical understanding and language.

Number - Division (The process of sharing a group fairly)

Understand division through sharing small quantities between 2, 5 and 10.

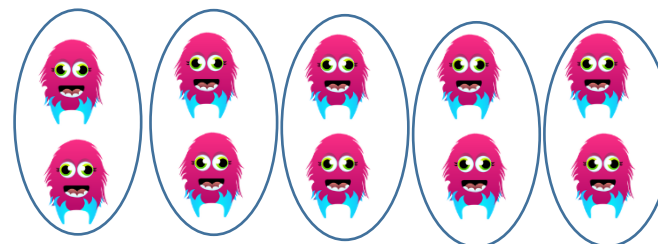
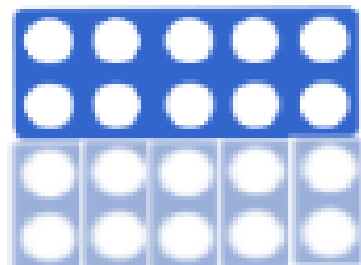
2 boys **share** six toys. How many toys do they each get?



They get 3 toys each.
 $6 \text{ divided by } 2 \text{ equals } 3.$

Sharing objects practically into equal sets picture to develop mathematical understanding and language.
Record as a picture.





There are 5 friends who want to **share** 10 toys. How many toys do they each get?



$10 \text{ divided by } 5 \text{ equals } 2.$
 $2 \text{ equals } 10 \text{ divided by } 5.$



Using Numicon alongside objects to make groups objects to develop mathematical understanding and language.
Record as a picture or drawing around Numicon.

Mathematics: Numbers

	A Unique Child: observing what a child is learning	Positive Relationships: what adults could do	Enabling Environments: what adults could provide
 Birth - 11 months	<ul style="list-style-type: none"> Notices changes in number of objects/images or sounds in group of up to 3. 	<ul style="list-style-type: none"> Sing number rhymes as you dress or change babies, e.g. 'One, Two, Buckle My Shoe'. Move with babies to the rhythm patterns in familiar songs and rhymes. Encourage babies to join in tapping and clapping along to simple rhythms. 	<ul style="list-style-type: none"> Display favourite things so that a young baby can see them. Provide a small group of the same objects in treasure baskets, as well as single items, e.g. two fir cones or three shells. Create a mobile, occasionally changing the number of items you hang on it. Collect number rhymes which are repetitive and are related to children's actions and experiences, for example, 'Peter Hammers with One Hammer'. Use song and rhymes during personal routines, e.g. 'Two Little Eyes to Look Around', pointing to their eyes, one by one. Collect number and counting rhymes from a range of cultures and in other languages. This will benefit all children and will give additional support for children learning English as an additional language.
 8-20 months	<ul style="list-style-type: none"> Develops an awareness of number names through their enjoyment of action rhymes and songs that relate to their experience of numbers. Has some understanding that things exist, even when out of sight. 		
 16-26 months	<ul style="list-style-type: none"> Knows that things exist, even when out of sight. Beginning to organise and categorise objects, e.g. putting all the teddy bears together or teddies and cars in separate piles. Says some counting words randomly. 	<ul style="list-style-type: none"> Use number words in meaningful contexts, e.g. 'Here is your other mitten. Now we have two'. Talk to young children about 'lots' and 'few' as they play. Talk about young children's choices and, where appropriate, demonstrate how counting helps us to find out how many. Talk about the maths in everyday situations, e.g. doing up a coat, one hole for each button. Tell parents about all the ways children learn about numbers in your setting. Have interpreter support or translated materials to support children and families learning English as an additional language 	<ul style="list-style-type: none"> Provide varied opportunities to explore 'lots' and 'few' in play. Equip the role-play area with things that can be sorted in different ways. Provide collections of objects that can be sorted and matched in various ways. Provide resources that support children in making one-to-one correspondences, e.g. giving each dolly a cup.
 22-36 months	<ul style="list-style-type: none"> Selects a small number of objects from a group when asked, for example, 'please give me one', 'please give me two'. Recites some number names in sequence. Creates and experiments with symbols and marks representing ideas of number. Begins to make comparisons between quantities. Uses some language of quantities, such as 'more' and 'a lot'. Knows that a group of things changes in quantity when something is added or taken away. 	<ul style="list-style-type: none"> Encourage parents of children learning English as an additional language to talk in their home language about quantities and numbers. Sing counting songs and rhymes which help to develop children's understanding of number, such as 'Two Little Dickie Birds'. Play games which relate to number order, addition and subtraction, such as hopscotch and skittles and target games. 	<ul style="list-style-type: none"> Make a display with the children about their favourite things. Talk about how many like apples, or which of them watches a particular TV programme at home. Provide props for children to act out counting songs and rhymes. Provide games and equipment that offer opportunities for counting, such as skittles. Plan to incorporate a mathematical component in areas such as the sand, water or other play areas.

Children develop at their own rates, and in their own ways. The development statements and their order should not be taken as necessary steps for individual children. They should not be used as checklists. The age/stage bands overlap because these are not fixed age boundaries but suggest a typical range of development.

Mathematics: Numbers

	A Unique Child: observing what a child is learning	Positive Relationships: what adults could do	Enabling Environments: what adults could provide
 30-50 months	<ul style="list-style-type: none"> • Uses some number names and number language spontaneously. • Uses some number names accurately in play. • Recites numbers in order to 10. • Knows that numbers identify how many objects are in a set. • Beginning to represent numbers using fingers, marks on paper or pictures. • Sometimes matches numeral and quantity correctly. • Shows curiosity about numbers by offering comments or asking questions. • Compares two groups of objects, saying when they have the same number. • Shows an interest in number problems. • Separates a group of three or four objects in different ways, beginning to recognise that the total is still the same. • Shows an interest in numerals in the environment. • Shows an interest in representing numbers. • Realises not only objects, but anything can be counted, including steps, claps or jumps. 	<ul style="list-style-type: none"> • Use number language, e.g. 'one', 'two', 'three', 'lots', 'fewer', 'hundreds', 'how many?' and 'count' in a variety of situations. • Support children's developing understanding of abstraction by counting things that are not objects, such as hops, jumps, clicks or claps. • Model counting of objects in a random layout, showing the result is always the same as long as each object is only counted once. • Model and encourage use of mathematical language e.g. asking questions such as 'How many saucers will fit on the shelf?' • Help children to understand that one thing can be shared by number of pieces, e.g. a pizza. • As you read number stories or rhymes, ask e.g. 'When one more frog jumps in, how many will there be in the pool altogether?' • Use pictures and objects to illustrate counting songs, rhymes and number stories. • Encourage children to use mark-making to support their thinking about numbers and simple problems. • Talk with children about the strategies they are using, e.g. to work out a solution to a simple problem by using fingers or counting aloud. 	<ul style="list-style-type: none"> • Give children a reason to count, e.g. by asking them to select enough wrist bands for three friends to play with the puppets. • Enable children to note the 'missing set', e.g. 'There are none left' when sharing things out. • Provide number labels for children to use, e.g. by putting a number label on each bike and a corresponding number on each parking space. • Include counting money and change in role-play games. • Create opportunities for children to separate objects into unequal groups as well as equal groups. • Provide story props that children can use in their play, e.g. varieties of fruit and several baskets like Handa's in the story <i>Handa's Surprise</i> by Eileen Browne.
 40-60+ months	<ul style="list-style-type: none"> • Recognise some numerals of personal significance. • Recognises numerals 1 to 5. • Counts up to three or four objects by saying one number name for each item. • Counts actions or objects which cannot be moved. • Counts objects to 10, and beginning to count beyond 10. • Counts out up to six objects from a larger group. 	<ul style="list-style-type: none"> • Encourage estimation, e.g. estimate how many sandwiches to make for the picnic. • Encourage use of mathematical language, e.g. number names to ten: 'Have you got enough to give me three?' • Ensure that children are involved in making displays, e.g. making their own pictograms of lunch choices. Develop this as a 3D representation using bricks and discuss the most popular choices. • Add numerals to all areas of learning and development, e.g. to a display of a favourite story, such as 'The Three Billy Goats Gruff'. 	<ul style="list-style-type: none"> • Provide collections of interesting things for children to sort, order, count and label in their play. • Display numerals in purposeful contexts, e.g. a sign showing how many children can play on a number track. • Use tactile numeral cards made from sandpaper, velvet or string. • Create opportunities for children to experiment with a number of objects, the written numeral and the written number word. Develop this through matching activities with a range of numbers, numerals and a selection of objects.

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Mathematics: Numbers

	A Unique Child: observing what a child is learning	Positive Relationships: what adults could do	Enabling Environments: what adults could provide
	<ul style="list-style-type: none"> • Selects the correct numeral to represent 1 to 5, then 1 to 10 objects. • Counts an irregular arrangement of up to ten objects. • Estimates how many objects they can see and checks by counting them. • Uses the language of 'more' and 'fewer' to compare two sets of objects. • Finds the total number of items in two groups by counting all of them. • Says the number that is one more than a given number. • Finds one more or one less from a group of up to five objects, then ten objects. • In practical activities and discussion, beginning to use the vocabulary involved in adding and subtracting. • Records, using marks that they can interpret and explain. • Begins to identify own mathematical problems based on own interests and fascinations. <p>Early Learning Goal Children count reliably with numbers from one to 20, place them in order and say which number is one more or one less than a given number. Using quantities and objects, they add and subtract two single-digit numbers and count on or back to find the answer. They solve problems, including doubling, halving and sharing.</p>	<ul style="list-style-type: none"> • Make books about numbers that have meaning for the child such as favourite numbers, birth dates or telephone numbers. • Use rhymes, songs and stories involving counting on and counting back in ones, twos, fives and tens. • Emphasise the empty set and introduce the concept of nothing or zero. • Show interest in how children solve problems and value their different solutions. • Make sure children are secure about the order of numbers before asking what comes after or before each number. • Discuss with children how problems relate to others they have met, and their different solutions. • Talk about the methods children use to answer a problem they have posed, e.g. 'Get one more, and then we will both have two.' • Encourage children to make up their own story problems for other children to solve. • Encourage children to extend problems, e.g. "Suppose there were three people to share the bricks between instead of two". • Use mathematical vocabulary and demonstrate methods of recording, using standard notation where appropriate. • Give children learning English as additional language opportunities to work in their home language to ensure accurate understanding of concepts. 	<ul style="list-style-type: none"> • Use a 100 square to show number patterns. • Encourage children to count the things they see and talk about and use numbers beyond ten • Make number games readily available and teach children how to use them. • Display interesting books about number. • Play games such as hide and seek that involve counting. • Encourage children to record what they have done, e.g. by drawing or tallying. • Use number staircases to show a starting point and how you arrive at another point when something is added or taken away. • Provide a wide range of number resources and encourage children to be creative in identifying and devising problems and solutions in all areas of learning. • Make number lines available for reference and encourage children to use them in their own play. • Big number lines may be more appropriate than counters for children with physical impairments. • Help children to understand that five fingers on each hand make a total of ten fingers altogether, or that two rows of three eggs in the box make six eggs altogether.