

Becoming a Mathematician

Guidance to support teaching and learning in mathematics for
Early Years Foundation Stage



**Playing and
Exploring**

Creating and Thinking Critically



**Active
Learning**

Mathematics Overview

This document provides guidance to support adult initiated/led teaching alongside child initiated/adult supported opportunities within the environment, which together support the children's holistic mathematical development. This is underpinned by the **Characteristics of Effective Learning: playing and exploring, active learning and creating and thinking critically**, which is intrinsic to how children learn within the EYFS, in this case, specifically within the Early Learning Goal for **Mathematics- Number**

Characteristics of Effective Learning (Development Matters)
Playing and Exploring – Engagement <ul style="list-style-type: none">• Finding out and exploring• Playing with what they know• Being willing to 'have a go'
Active learning – Motivation <ul style="list-style-type: none">• Being involved and concentrating• Keeping trying• Enjoying achieving what they set out to do
Creating and Thinking Critically – Thinking <ul style="list-style-type: none">• Having their own ideas• Making links• Choosing ways to do things

Early Learning Goals for Mathematics
Numbers: children count reliably with numbers from 1 to 20, place them in order and say which number is one more or one less than a given number. Using quantities and objects, they add and subtract two single-digit numbers and count on or back to find the answer. They solve problems, including doubling, halving and sharing.
Shape, space and measures: children use everyday language to talk about size, weight, capacity, position, distance, time and money to compare quantities and objects and to solve problems. They recognise, create and describe patterns. They explore characteristics of everyday objects and shapes and use mathematical language to describe them

Each section is structured with a highlighted aspect of the Early Learning Goal (ELG) and the related statements taken from the Development Matters document to support the children to meet the ELG. As the statement '**Records, using marks that they can interpret and explain**' is a golden thread and an integral element of the Enabling Environments it has been included as a reminder to be encouraged and supported wherever possible.

It is important to ensure there is a balance between both adult led/initiated and the child initiated/adult supporting learning experiences. Adult led activities should take account of children's interests and learning styles, maximising the use of the areas of provision within the environment both indoors and out. Some of the adult led activities included could easily lead onto children developing and practising mathematical skills in their own way and providing further learning possibilities, through enabling environments. There are just a few examples given within the Enabling Environment sections of this document. However it is important and possible to provide many other opportunities both within the indoor and outdoor provision, through songs, rhymes/stories, routines etc. Embedding mathematical learning opportunities within daily routines makes it real and purposeful.

We have included weblinks to suitable resources from Nrich. You may also find their EYFS section helpful - <http://nrich.maths.org/early-years> as well as the curriculum map for EYFS and KS1 - <http://nrich.maths.org/content/id/8853/EYFSKS1CurriculumLinkedToNRICHJan16.pdf>

An overview of how you might teach aspects of the ELGs for Mathematics over the course of a year can be found at mathshub@trinityacadmeyhalifax.org

Practitioners may also find the following links useful – (*ctrl+click anything in blue and underlined*)

- NCETM has two modules for early years – about counting and number. You do have to register, but it is free. The archives on the site also house past issues of Early Years Magazine with many specialist articles. -
<https://www.ncetm.org.uk/resources/31856>
- The Erikson Institute in USA has an early mathematics collaboration website and includes some Big Ideas in mathematics:
<http://earlymath.erikson.edu/big-ideas/page/3/>
- The STEM website includes many links to mathematical materials for the early years -
https://www.stem.org.uk/resources/search?=&Search&resource_query=Early+Year+mathematics
- The Foundation Years site stores several National Strategies publications which still have much relevance, including Numbers and Patterns, Mark Making Matters and Children Thinking Mathematically
http://www.foundationyears.org.uk/wp-content/uploads/2011/10/Numbers_and_Patterns.pdf
http://www.foundationyears.org.uk/wp-content/uploads/2011/10/Mark_Marking_Matters.pdf
http://www.foundationyears.org.uk/wp-content/uploads/national_strategies_resources/childrethinkingmathematically_psrn.pdf
- The National Numeracy Family Maths Toolkit is full of ideas and free activities for children and families:
<http://www.familymathstoolkit.org.uk/advice-for-families>
- Find out more about the NDNA Maths Champions Programme (which includes online audit tools, online training, resource bank with over 700 resources including over 350 activity ideas to support maths through play with materials already in your setting) here: -
<http://www.ndna.org.uk/childcare-training-maths-champions>
- This material from New Zealand is intended to support practitioners to use opportunities that arise in everyday interactions with children to foster the development of mathematical thinking: -
<http://nzmaths.co.nz/supporting-rich-mathematical-interactions-ece>
- The National Children’s Bureau (NCB) website includes the 2014 report Making Maths REAL – Working with parents to support children’s early mathematical development: -
http://www.ncb.org.uk/media/1158876/ncb_making_maths_real_august_2014.pdf
- The Children’s Mathematics Network has many examples of children’s mathematical mark making and also the taxonomy of children’s mathematical graphics: -
<http://www.childrens-mathematics.net/>

Numbers

Children count reliably with numbers from 1 to 20, place them in order and say which number is one more or one less than a given number.

Using quantities and object.

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.

Big Ideas

Recognise that the purpose of counting is to tell how many there are

1:1 correspondence: Count objects in a line first touching them one by one;
Count objects arranged randomly using different strategies to count one by one

Cardinality: understand that the last number spoken is the answer to 'how many?'

Conservation of number: understand that no matter in which order a collection is counted the number remains the same

Subitising: recognise numbers in small groups without the need for counting (e.g. using dice patterns, tens frames, Numicon etc.)

Concept of zero: begin to recognise 'zero' as the cardinal number associated with 'none', through stories, rhymes and when counting back.

Key Mathematical Vocabulary

number, zero, one, two, three to twenty (and beyond)
teens, eleven, twelve,

none

How many?

count on (to or from) count up (to), count back (to or from)

count in ones, twos, fives, tens

is the same as, equals, balances, as many as

more, larger, bigger, greater, biggest, most

less, fewer, smaller, smallest, least

odd, even

ones, tens, digits

compare, order, size

first, second, third..... last, before, after, next, between

guess, estimate, nearly, close to, about, just over, just under, too many,

too few, enough, not enough

Securing key skills and embedding understanding

Develop fluency in oral counting skills

count forwards and backwards

count forwards from any number

count backwards from any number

start at a given number and stop at a given number

Focus on teen numbers

Ensure pronunciation is correct fourteen not forty

Secure accurate object counting

encourage children to estimate and to check their counting for sense and errors

Develop proficiency in reading and writing numerals

Display number lines which include the numeral, the number word and a visual representation of the number (dice patterns, Numicon or tens frame images)

Provide opportunities in the writing area to develop correct number formation

Provide opportunities to discuss different fonts or different numerals for 4 or 7

Activities Stories and Songs

Songs and Rhymes

Counting forwards - Peter hammers with one hammer; One, two, three, four, five. Once I caught a fish alive; One potato, two potato, three potato, four
NB. Many number rhymes require quite complex skills in counting backwards
Rhymes which focus on 'five' can easily be extended – 'Eight Little Speckled Frogs'

Story Books

Ten Little Rubber ducks - Eric Carle

One is a Snail, Ten is a Crab -April Pulley Sayre

More or Less? - Stuart J Murphy

How Big is a Million? - Anna Milbourne

One Fluffy Baa Lamb, Ten Hairy Caterpillars - Nick Sharratt

Ten Little Pirates - Brownlow & Rickety

[Links to NRICH activities provide suggestions of rich contexts for exploring mathematical ideas and developing mathematical skills and concepts They are linked to mathematical learning goals.](#)

Numbers

Children count reliably with numbers from 1 to 20, place them in order and say which number is one more or one less than a given number.

- Count up to three or four objects by saying one number name for each item
- Count actions or objects which cannot be moved
- Count objects to 10, and begin to count beyond 10
- Count out up to six objects from a larger group
- Count any irregular arrangement of up to ten objects
- Estimates how many objects they can see and checks by counting them

Adult Initiated

Count objects in a line: first touching them one by one; then without touching them.



Count objects arranged randomly:

- by moving them into a straight line
- by moving them across one by one when counted;
- by leaving them in position but touching them;



Can you find an easy way to count these? Could you do it another way?

Count the same number of different objects:

- Can you find and count 4 buttons, 4 pencils, 4 bricks, 4 tables, 4 children, 4 hoops,*
- Can you find the Numicon shape for 4? Where is number 4 on the number track?*

Spot the mistake when the puppet counts:

Do you think the puppet counted correctly? What did he do wrong? Can you help him to count again? What does he need to remember next time he counts?

Count sounds and actions:

Can you count the beats of the drum? Count the pebbles as I drop them into the bucket?

Count the number of times you skip with your skipping rope.

Watch the frog jump along the blank number track. Count the jumps aloud as the frog makes them. How many jumps did the frog make? Count the jumps quietly using fingers. Can you count them in your head?

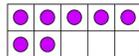
How many giant strides do you think you will take to get to the door? How can you check?

Count objects from a larger group:

In the water can you catch 6 fish? How do you know that you have caught 6? Can you find the same amount of shells? What's the same? What's different?

Estimate how many objects there are and check by counting:

Use tens frames which are part filled, flash for a few seconds then ask children to build a tens frame to match.



Enabling Environments –child initiated, adult supported

CHILDREN RECORD, USING MARKS THEY CAN INTERPRET AND EXPLAIN

Outdoors

Children use baskets, bags etc., to collect a specific number of different found materials in the outdoors, sort and count

Construction (indoors /outdoors): can you make a model, obstacle course using a certain number of block, pieces of equipment?

Indoors

Role Play: in the shop model shopping from a list, choosing and counting 3 apples, 6 carrots, 5 bananas, placing each in a basket as you count. Encourage children to make shopping lists.

Art Area: create a picture with a certain number of objects or make a picture and count the objects used. (this can be done outdoors using large scale outdoor/ natural, found materials/objects)

[NRICH EYFS: Playing Incey Wincey Spider](#)

[NRICH EYFS: Number Book](#)

[NRICH EYFS: Owl's Packing List](#)

Numbers

Children count reliably with numbers from 1 to 20, place them in order and say which number is one more or one less than a given number.

Recognise some numerals of personal significance

Recognise numerals 1 to 5

Select the correct numeral to represent 1 to 5, then 1 to 10 objects

Adult Initiated

Sort the birthday cards: *How did you sort them? Can you use the numbers to sort them? Which numbers were on your cards last birthday? Which will be on your cards next birthday?*

Spot numbers around school, out on a walk, going to a shop, and say what they are. *Where can we spot the number 8?* -on a clock face, in this pack of shuffled cards, on a calculator key-pad, on the 'shop' till, on the telephone, on the computer keyboard,

Match numbers to collections of real objects

Use number cards as labels to show how many animals there are in each field...

How many eggs there are in each nest? Which number could we use to show that?

Match numbers to dot patterns:

in pairs of dice, one with dots, one with on dominoes or on tens frames

Play matching games such as snap and Pairs, first matching numerals then matching numerals to dot patterns (as above) or Numicon shapes

Recognise numbers on the number track .Stand on 6 on the floor number track.

Hop back to 0. Say the numbers as you go. Throw a beanbag onto the track. *What number have you landed on? How many jumps on the track will you need to get there? Count as you jump.*

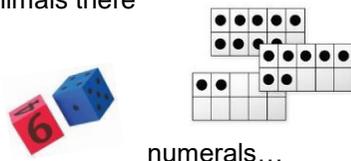
Guess the number: hide a large numeral so that it can be slowly revealed *What number might this be? How do you know? Are there any numbers it couldn't be? Can you explain why it can't be number 6?*

Hide the numbers around the room so that only part of each is revealed. Can the children guess where each number is hiding? *Are any numbers missing? How can we check?*

Make number labels for the number of pairs of scissors kept in the jar, the number of paint brushes kept in the pot, the number of pieces in the jigsaw box... display with the matching Numicon shape.

Encourage children to children make price labels for things in the 'shop', for tickets for the 'bus', for things on the menu in the 'café', for raffle tickets...

Pick out number names on the pages of favourite rhymes or stories such as: Three Billie Goats Gruff, Three Little Pigs, Goldilocks, Snow White...



Enabling Environments –child initiated, adult supported

CHILDREN RECORD, USING MARKS THEY CAN INTERPRET AND EXPLAIN

Outdoors

Children use a large blank tens frame (made from masking tape or sticks) to make collections of found materials in the outdoors to correspond to each numeral

Children set up their own number trails

Car parking: mark out parking bays using chalk/masking tape. Cars to be parked in numbered bays. Numbers or dots can be added to cars to park in the corresponding numbered parking space

Mud Kitchen: follow recipes e.g., add 3 pine cones, 5 leaves, 7 stones etc.

Indoors

Small world: mark out a car park, numbering the bays on a shoebox lid for small world cars to park. Small world farm- specific numbers of animals in different fields

Role play: in the café- taking orders, writing the menu- cost of items

In the home corner- following recipes, writing shopping lists- 4 sausages, 5 eggs
Numbering seats on the train, the bus or for the music show etc.,- making tickets to match seat numbers

Sand/water: Find a digit, pour that many cups into a container and add that many beads etc.

[NRICH EYFS: Tidying](#)

[NRICH EYFS: Dice](#)

[NRICH EYFS: Golden Beans](#)

Numbers

Children count reliably with numbers from 1 to 20, place them in order and say which number is one more or one less than a given number.

Use the language of 'more' and 'fewer' to compare two sets of objects

Say the number that is one more than a given number

Finds one more or one less from a group of up to 5 then 10 objects

Adult Initiated

Find out **by counting** which of two collections has more/fewer objects. In each case, check if necessary by lining up and matching one-to-one
 Count the cups and saucers. *Are there more cups or more saucers, or the same number?*
 Count the red bricks and the blue ones. Are there fewer red bricks or fewer blue ones?

Number boxes. Fill small gift boxes with a collection of items. (pebbles, shells, feathers, coins) Ask children to shake boxes and guess what might be inside and how many things there might be. Open the box and count; naming objects as they count will develop counting skills; *1 shell, 2 shells, 3 shells...*

Once children have opened their box and counted the objects they can then begin to discuss and compare *Who has the most? Do you have more than ...? Do you have fewer than....? If I give you one more how many will you have then? How can you check?*



Make a staircase pattern with bricks, or on pegboard...

Make each step one more.

How many are in this step? How many will be in the next step? How do you know?

Build a Numicon staircase adding one to each shape to find which shape comes next. Link to number line. What number is one more than 3? Than 9?

Set out chairs or boxes to make a bus. Invite children to be the passengers. *There are 3 people on the bus. 1 more gets on. How many are on the bus now? So 1 more that 3 is 4.*

Play 5 Interesting things: Give children paper plates and ask them to select 5 things from a collection of 'interesting' objects. Using a die or spinner marked 1 more/ 1 less children add 1 to their collection or remove 1. *How many did you have? What will 1 more/less be? Are you sure? Who has the most now? Who has the fewest?*

Remember the distinction between 'fewer' and 'less.'

Fewer teddies, fewer sweets, fewer pebbles, fewer cups of tea (object can be counted.) Less water, less sand, less tea (abstract or mass)

Enabling Environments –child initiated, adult supported

CHILDREN RECORD, USING MARKS THEY CAN INTERPRET AND EXPLAIN

Indoors / Outdoors

Role play: when having a picnic another teddy comes... In the home corner another guest come for tea.... *How many more cups, sandwiches etc. do we need?*
 Setting out chairs or boxes to make a bus, train etc. (see section opposite)

Construction area: build 1 more room

Who has used the most/ fewer bricks in their models?

Transient Art/ open ended materials: using more /fewer natural objects when making a picture, design or art work

Mud Kitchen: adding more or fewer objects to mixture/potion e.g., adding more leaves from the herbs growing beside the kitchen- Adapting recipes

[NRICH EYFS: Dressing Up](#)

[NRICH EYFS: Baskets](#)

Numbers

Children count reliably with numbers from 1 to 20, place them in order and say which number is one more or one less than a given number.
Using quantities and objects, they add and subtract two single-digit numbers and count on or back to find the answer.
They solve problems, including doubling, halving and sharing.

Big Ideas

Addition: understand addition as combining two or more groups; understand addition as increasing

Commutativity: understand that $2 + 4 = 4 + 2$

Subtraction: understand subtraction as take away; understand subtraction as decreasing; understand subtraction as finding the difference between

Composition and decomposition: begin to understand how a number can be composed of other numbers, for example $6 = 4 + 2 = 3 + 3 = \dots$

Equivalence: begin to recognise equivalence of number refers to situations where two sets of objects have the same **quantity** value.

Equal sharing: explore in practical contexts

Key Mathematical Vocabulary

How many?

count on (to or from) count up (to), count back (to or from)

is the same as, equals, balances, as many as, make

more, larger, bigger, greater, biggest, most

less, fewer, smaller, smallest, least

odd, even, pattern

ones, tens, digits

add, more, and, make, total, sum, altogether

How many more to make? How many more is than....?

take away

How many are left? How many are gone? How many fewer is than....?

sharing, doubling, halving, twice as many

parts of a whole, half, quarter

groups of, equal groups of

Securing key skills and embedding understanding

Recognise and support problem situations which can be represented by part-part-whole relationships and addition or subtraction.

Use practical equipment, real objects and real/imaginary contexts to develop conceptual understanding

Provide visual models to support understanding of part whole relationships and the composition of numbers



Use concrete and visual models such as tens frames and Numicon shapes.

Remember tens frames can be made/drawn, any size and anywhere; inside and out.



Guide children towards more efficient **counting on** and **counting back** strategies
Develop the language of comparison

Activities Stories and Songs

Songs and Rhymes

Tom Thumb's Musical Maths- Helen MacGregor- range of songs and rhymes to support counting skills

Supermarket shop-adding one more item to the basket and calculating how many.

Ten in the bed-subtraction

Story Books

One Ted Falls out of Bed – Julia Donaldson

Ten Terrible Dinosaurs- Paul Strickland

My Granny went to Market – Stella Blackstone

When Sheep Cannot Sleep - Satoshi Kitamura

The doorbell Rang – Pat Hutchins

[Links to NRICH activities provide suggestions of rich contexts for exploring mathematical ideas and developing mathematical skills and concepts They are linked to mathematical learning goals.](#)

Numbers

Using quantities and objects, they add and subtract two single-digit numbers and count on or back to find the answer.

Finds the total number of items in two groups by counting them all

In practical activities and discussion, beginning to use the vocabulary involved in adding and subtracting.

Adult Initiated

Find the total by counting all: There are 2 cars in the garage. Let's count them. 3 more arrive. Let's count them. How many cars now?(Count: 1, 2... 1, 2, 3... 1, 2, 3, 4, 5)

Use the part-whole model to support understanding of moving the two parts together to find the whole/ total



There are three cookies on one plate and two on another, how many cookies are there altogether?

Say how many there are altogether by counting on.

Count 5 pebbles into a cloth bucket. How many pebbles are in the bucket?

Count 2 more pebbles into the bucket. How many pebbles are in the bucket now?

Hop three spaces on the number track. Now hop two more. *What number did you start on? Where are you now? Let's count on 2 from 3: 4, 5. So 3 add 2 is 5.*

Count 4 beans into a tin with a lid on. Emphasise that there are 4 beans in the tin.

Label the lid with 4. Put 3 more beans on the table.

How many beans are there altogether? (Count on 3 from the hidden 4: 5, 6, 7)

So 4 add 3 is 7.

Say how many are left when some are taken away, by counting back from the number.

We made 6 cookies. We ate 2 of them. How many cookies are left?

(Count back 2 from 6: 5, 4. Say together: 6 take away 2 is 4.)

Explore equivalence with balancing scales: place a number of counters or cubes in to clear plastic bags. Ask children to count and label the bags. *What do you think will happen when we put one bag on each side of the scale? Why do you think that will happen? Does everyone agree?*

Why is the 8 bag lower than the 5 bag? What could we do to make the scales balance? How many should we add to this bag? Why do you think that will work?

Could we take some away?

Enabling Environments –child initiated, adult supported

CHILDREN RECORD, USING MARKS THEY CAN INTERPRET AND EXPLAIN

Outdoors

Role play: car parking at the garage- 2 cars already parked. 3 more arrive (see opposite section)

Construction: make a boat with seats out of large blocks/planks crates. 3 passengers get on. At the next port 2 more are waiting to get aboard (count on). *How many passengers are left when 1 leaves the boat?* (count back)

Collecting bricks in the trolley/ wheelbarrow etc. Count 6 bricks into the wheelbarrow and then 2 more. *How many bricks are in your load now?*

Indoors

Small world: adding more play people to the house, castle, etc., adding more or taking them away dinosaurs from the 'swamp' *How many are there now?*

Malleable area: rolling out 4 'buns' and putting them on a tray. Rolling out 3 more and putting them on another tray/same tray? *How many have we now?* (counting on)

Counting back activities from the 'buns/cakes' left.

Adding candles to a birthday cake.

Cooking:

Counting spoonfuls when baking

[NRICH EYFS: Number Rhymes](#)

Numbers

They solve problems, including doubling, halving and sharing.

Begins to identify own mathematical problems based on own interests and fascinations.

Adult Initiated

Use Dominos; *Can you find all the double dominos? What do you notice? Can you make a double domino? Tell me about your double domino.*

Use Numicon shapes to find matching pairs.

Find half using objects; *How many apples are in the box? Take half of them out. How many did you take out? How many are left?*

Cut the cake in half. *How many pieces do you have now? Are the pieces the same size? How can we check? If we cut two cakes in half how many pieces will we have? Let's check.*

Explain how up to 10 objects can be separated into two groups, finding different ways of doing it;
Find different ways of throwing 5 bean bags one by one
How many went in the bucket? How many missed?

Find different ways of putting 6 eggs in a box, choosing from red eggs and yellow eggs. *How many red eggs have you chosen? How many Yellow ones will you need? You have 4 red eggs and 2 yellow eggs how many eggs do you have altogether? Could you make 6 in a different way?*

Using two large foam dice to try to score 6. *How did you score 6? Who did it a different way?*

Plant bulbs; *How should we plant the daffodil bulbs in these three pots? Is there a way of doing it so that they all have the same number? Are any left over?*

Find different ways to make 10 using tens frames or Numicon to support

Solve problems based on stories such as:
The Giant Jam Sandwich... The Bad-Tempered Ladybird...The Very Hungry Caterpillar... New Clothes for Alex...Goldilocks and the Three Bears... The Little Gingerbread Boy...

Encourage children to extend problems; *Suppose there were three people to share the bricks between instead of two.*

Enabling Environments –child initiated, adult supported

CHILDREN RECORD, USING MARKS THEY CAN INTERPRET AND EXPLAIN

Outdoors

Throwing games: bean bags, hoops/buckets (see opposite) recording the score

Role play: in the ice cream shop- be able to buy 'double scoops'
Transporting the dolls in double buggies

Indoors

Snack time routines; sharing the fruit, crackers etc.

Small world: putting half of: the sheep in the field... the cars in the garage... the dinosaurs in the forest... the play people in the house... the animals in the ark...

Malleable area: making a cake, pizza etc.- cutting it into half . *How many pieces are there? Can you share the 6 buns/ sausage rolls you have made between 2 or 3 children? How many will they each get?*

Water area: sharing 6 frogs between 2 lily pads/ fish between 2 ponds

[NRICH EYFS: Using Books](#)

[NRICH EYFS: Maths Story Time](#)

Shape, Space and Measures

Children use everyday language to talk about size, weight, capacity, position, distance, time and money to compare quantities and objects and to solve problems.

They recognise, create and describe patterns.

They explore characteristics of everyday objects and shapes and use mathematical language to describe them.

Big Ideas

Comparison: use an attribute such as length, weight, capacity, age, value to compare two or more objects.

Conservation: understand that the flat ball of play dough will weigh the same when it has been rolled into a sausage
understand that the volume of water in a tall thin jar does not change when it is poured into a wide shallow one

Order three or more objects using the language of comparison to discuss each object in relation to the others.

Non-standard units: introduce children to the idea of measuring in units through familiar objects

Key Mathematical Vocabulary

measure, size, compare, guess, estimate,
nearly, close to, about the same as, just over, just under
enough, not enough, too much, too little, too many, too few
length, height, width,
long, short, tall, longer, shorter, taller, longest, shortest, tallest
narrow, thick, thin,
weigh, weighs, weighs the same as, balances, heavy, light, heavier than, lighter than,
heaviest, lightest, scales
full, empty, holds, container, half full, holds more, holds less
position, over, under, above, below, top, bottom, side,
on, in, outside, inside, around, in front, behind, back, front,
beside, next to, opposite, between, middle, edge, corner
direction, left, right, up, down, forwards, backwards, sideways
across, next to, close, near, far, along, through, to, from, towards, away from

Securing key skills and embedding understanding

When comparing; choose objects which exaggerate the attribute; a large, light object can be balanced against a small heavy object to focus attention on weight not height or width.

Compare weight using objects placed in identical sealed boxes or pots so that size of the objects remains constant.

Comparing the weight of two objects by hand is easier if each object is placed in an identical carrier bag.

Develop the language of comparison; model the language and encouraging children to make both statements; *this is lighter than – this is heavier than*

Provide real contexts for learning which engage children in the purposeful use of measurement

Provide a variety of equipment which children can use to solve their own measurement problems.

Activities Stories and Songs

Songs and Rhymes

The Hokey Cokey song (left and right)

Goldilocks went to the house of the bears (size)

Story Books

Jim and The Beanstalk -Raymond Briggs

Goldilocks and the Three Bears

We are going on a bear hunt - Michael Rosen

Rosie's Walk - Pat Hutchin

Marvin Weighs In - Dave Browning

Inside Outside Upside Down -Stan Berenstain

Ruby and the Parcel Bear- Maggie Glen

The Train Ride-June Crebbin

[Links to NRICH activities provide suggestions of rich contexts for exploring mathematical ideas and developing mathematical skills and concepts They are linked to mathematical learning goals.](#)

Shape, Space and Measures

Children use everyday language to talk about size, weight, capacity, position, distance, time and money to compare quantities and objects and to solve problems –

Orders two items by weight or capacity; orders two or three items by length or height.

Adult Initiated

Compare the heights of two, then three, children by standing back to back or lying on the floor.

Compare the lengths of two, then three, pencils, pens, crayons and paint brushes. Check that the children match the ends correctly. *Which is longest? How can you tell? Is the crayon longer or shorter than the pen? Where do you think we should put this brush? Why?*

Find, pick out or make objects that are taller, shorter, wider, thinner or heavier, lighter... than a given one;
*Can you find a ribbon in the 'ribbon shop' that is wider than this one?
Can you find a shell that is lighter than this one? How can we check?
Which bucket will hold the bucket the most? How can we find out?*

Use a balance to find out which of two, then three, teddies, lunch boxes, shoes... is lighter
Guess if the banana is lighter than the orange, when they are held in the hands.
*How can we check? What do you think will happen when we put the banana on this side of the balance scale and the orange on this side?
Find three things which you think will be lighter than the orange. Were you right?*
Predict whether a large packet of cotton wool is heavier or lighter than a small tin of tomatoes.

Guess first then check:

*How far up the wall you can reach?
How far you can throw the bean bag?
How far you can jump from this line?
How full will this bottle will be when I pour in this jug of water?
Will all the water in the bowl will go into the bucket, or will there be too much?*

Use non-standard measures. *How many cubes long is your foot? Whose foot is longest?*

Measure the rocket using Lego bricks. Measure it again using lolly sticks. *What do you notice? Why do you think it measured less when you used the lolly sticks?*

Enabling Environments –child initiated, adult supported

CHILDREN RECORD, USING MARKS THEY CAN INTERPRET AND EXPLAIN

Indoors and Outdoors

Make sure there are resources and collections e.g. natural objects, seasonal nature collections etc. available for children to make comparisons and extend adult initiated experiences.

Tidying routines: e.g. Putting sand and water resources, organising the different sizes of wood blocks. *Where does the larger spade go? Which block is the same size as this one?*

Outdoors

Ribbons on a washing line: model language e.g., -long, longest, longer than-short, shortest, shorter than, equal length

Treasure hunts: *Can you find....2 sticks shorter than this one? 3 stones heavier than the shell?*

Investigate the size of puddles. *How can we work out which is the bigger?
How many sticks wide is the....? How many sticks high is the*

Water/sand area: comparisons of which container holds more/ is the heavier? Using non-standard containers to measure, e.g. cups, spoons, tubs etc. *How many did it take to fill it?* [NRICH EYFS: Water Water](#)

Indoors

Role Play: Traditional stories

Goldilocks and the 3 Bears in the home corner

Titch: explore the different sized clothes and toys etc

Ruby and the Parcel Bear: play activities linked to different sized parcels, wrapping presents [NRICH EYFS: Presents](#)

Set up a shop /post office- weighing, wrapping, length of string/ribbon. *Which parcel is the heaviest? Can we sort them heaviest to lightest?* [NRICH EYFS: Balances](#)

Malleable Area: making playdoh worms. *Which is the longest? Can you make one shorter/longer than this one?* Choosing/ ordering different sized rolling pins. *Which rolling pin is longer?* [NRICH EYFS: Long Creatures](#)

Shape, Space and Measures

Children use everyday language to talk about size, weight, capacity, **position, distance**, time and money to compare quantities and objects **and to solve problems.**

Can describe their relative position such as 'behind' or 'next to'.

Adult Initiated

Describe where objects are in a picture. For example: The fish is above the weed in the pond...

The frog is under the rock beside the pond...

Follow instructions to get through an obstacle course or over climbing equipment in PE, *stand in front of, behind, beside, opposite a partner... or between two others...*

Describe how things are stored on shelves in the classroom or in a cupboard. *Are the felt pens on top of, under, next to... the books?*

Use small world to follow and give instructions and talk about position.

Put the sheep on the trailer. Put the pigs in the pen. Where shall we put the hens? Can you tell where the cat is?

Talk about movements and directions.

In PE, follow instructions to run forwards, walk backwards, turn on the spot, turn to the left, turn to the right, face the front, or side, or back, or corner of the room, move away from the bars, slide down the ramp, roll on the mat...

Give instructions to other children to get round the classroom or through an obstacle course.

Go around the stool, go in front of the table,

Crawl under the bridge, go over the tyres and stop behind the swing

Describe a walk round the school or its grounds:

Take photographs of the journey to use back in the classroom. *We went along the path, through the tunnel in the adventure playground and then across the field...*

Explore and talk about things that turn, such as the hands of a clock, wheels, taps, keys in locks, screw top lids on jars...

Enabling Environments –child initiated, adult supported

CHILDREN RECORD, USING MARKS THEY CAN INTERPRET AND EXPLAIN

Make sure the resources are available for children to extend and revisit some of the adult initiated experiences opposite.

Outdoors

Digging/planting area; Model positional language when putting in plants. *Shall we put the sunflowers behind/ next to the ...?*

Den Building: Put the material over the top. Fasten the pegs onto the side. *Where shall we make the den? Under the tree or next to the fence?*

Roleplay: Journeys (e.g. The Train Ride) Planning a route. Drawing maps e.g. to find the treasure.

Planning where to play. *Shall we go through the tunnel and play next to the?*

Indoors

Small world: The train track layout: *Put the track through the tunnel. Put the trees next to the station etc.*

The doll's house: Position of the furniture and play people

ICT: Programming routes for the 'Beebot' to negotiate pathways made using construction blocks

Construction area: *Put the long block in front of the wall. Where shall we put the bridge? Where is the ramp going to go?*

[NRICH EYFS: Position with Wellies](#)

[NRICH EYFS: Queuing](#)

[NRICH EYFS: Scooters, Bikes and Trikes](#)

[NRICH EYFS: Paths](#)

Shape, Space and Measures

Children use everyday language to talk about size, weight, capacity, position, distance, **time and money** to compare quantities and objects **and to solve problems.**

They recognise, create and describe patterns.

They explore characteristics of everyday objects and shapes and use mathematical language to describe them.

Big Ideas

Recorded Time: understand the time in which something occurs, time of day, day of the week, month, season, year, special days and birthdays

Time Intervals: begin to understand the time that something takes to happen or the time that passes between two moments of recorded time

Understanding what money is and what it is used for.

The value of coins: to understand that coins have a value that is not related to colour, shape, size, mass etc.

Key Mathematical Vocabulary

measure, size, compare, guess, estimate
 days of the week (Monday, Tuesday etc.) day, week, month, year
 birthday, holiday, morning, afternoon, evening, night
 bedtime, dinner time, playtime, snack time
 today, yesterday, tomorrow,
 before, after, now, soon, early, late
 quick, quicker, quickest, quickly, slow, slower, slowest, slowly
 old, older, oldest, new, newer, newest
 takes longer, takes less time
 o'clock, hour, minute, second
 clock, watch, hands, time
 money, coin, penny, pence, pound
 price, cost, buy, sell, spend, spent, pay, change

Securing key skills and embedding understanding

Talk about time; focussing on and developing the extensive range of vocabulary and language patterns relating to time

Build time into everyday routines; giving children regular opportunities to talk about recorded time.

Provide a variety of equipment such as stop watches, timers and sand timers which children can use to solve their own time problems.

Use REAL money; children have fewer opportunities to handle money at home. Real coins often don't have the denomination numerals on so children need lots of experience handling them.

If children confidently use and recognise **Numicon shapes**, attaching coins to the same value shape can help children make strong connections to their existing knowledge and understanding of number.

Activities, Stories and Songs

Songs and Rhymes

Songs are an excellent way to learn the days of the week or the months in a year.
 Months of the Year-Apples, peaches, pears and plums, tell me when your birthday comes, January, February...
 Days of the week song-Sunday, Monday, Tuesday... 1,2,3,4,5,6,7,days
 Hickory Dickory Dock the mouse ran up the clock
 Money - 5 Currant Buns

Stories

What's The Time Mr Wolf? - Debi Gliori
 Cluck O' Clock - Kes Gray
 What time is it Mr Crocodile? – Judy Sierra
 The Great Pet Sale - Nick Inkpen
 The Very Hungry Caterpillar-Eric Carle

[Links to NRICH activities provide suggestions of rich contexts for exploring mathematical ideas and developing mathematical skills and concepts They are linked to mathematical learning goals.](#)

Shape, Space and Measures

Children use everyday language to talk about size, weight, capacity, position, distance, **time** and money to compare quantities and objects **and to solve problems.**

Use everyday language related to time

Order and sequence familiar events

Measure short periods of time in simple ways.

Adult Initiated

Talk about days of the week in everyday activities like taking the register, keeping a weather chart...

What did you do yesterday?

What will you do tomorrow?

Who has a birthday next week? Which day is it?

Begin to sequence events in the day,

Tell me what you did on your birthday

What do you see on your way home?

Make a zigzag book or arrange picture cards to tell the story of their special day or journey:

Sequence events in a well-known story ;

The Very Hungry Caterpillar by Eric Carle

The Bad-Tempered Ladybird by Eric Carle

Mr Wolf's Week by Colin Hawkins

Begin to know key times of the day

We go to assembly at 9 o'clock;

We go home at 3 o'clock;

What time do we have dinner? What time do you go to bed?

Begin to be aware of the duration of time.

Can we all change for PE before the sand runs through the timer?

Can you pack the bricks away before I count to 10?

How many hops can you do in a minute? Were you correct?

Enabling Environments –child initiated, adult supported

CHILDREN RECORD, USING MARKS THEY CAN INTERPRET AND EXPLAIN

Outdoors

Use a sand timer/ stop watches to:

Time laps done by child on bikes and scooters. *How many laps can you do in a minute?*

How long does it take to complete the obstacle course?

How many objects e.g. pine cone can you find in 1 minute?

Playing Hide and Seek: give to the count of 10 to hide

Indoors/Outdoors

Role play: times of trains, opening times of shops, when the bus, train, aeroplane will arrive /depart.

Role play in the home corner- e.g. birthdays. *What day is the party on? What time are we going to the shops, doctors etc.* Provide wall diaries, calendars and photographs to talk about -time,

Indoors

Sand area: Hide objects in the sand tray. *How many can find before the 10 second sand timer runs through?*

Writing area- provide wall diaries and calendars to refer to, role play making appointments etc

[NRICH EYFS: Timing](#)

Shape, Space and Measures

Children use everyday language to talk about size, weight, capacity, position, distance, time and **money** to compare quantities and objects **and to solve problems.**

Begin to use everyday language related to money

Adult Initiated

Use coins to pay for things or buy things in the class 'shop', tickets on the 'bus', at the 'funfair' or 'skittle alley'... recognising that coins are used to pay and give change.

Distinguish coins.

Sort money into spaces in a shop till, e.g. 10p, 50p, £1, £2;
Feed 20p or 50p coins into a pretend drinks machine or car park ticket machine;
Buy 20p stamps, using 20p coins;
In the 'pound shop', buy items costing £1, using £1 coins...

Visit a real shop and give children the opportunity to handle real money

Play money games.

For example, roll dice to collect £1 coins to the value of £10... or 1p coins to the value of 10p.

Help the puppet who has got into a muddle counting his money. *Can you help him sort his coins? How should he do it? Can you think of a good way to count these coins?*

Begin to recognise that some coins have a greater value than others, and will buy more: for example, 2p is worth more than 1p; 5p is worth more than 2p; £2 is worth more than £1.

Begin to count up how much is this is altogether?



Work out what to buy and how to pay.

James paid 3p for chews. *Which coins could he use? What if he paid 4p?*

Make price labels on items in the class 'shop' and match penny coins to them. Extend to using combinations of 2p and 1p coins.

Enabling Environments –child initiated, adult supported

CHILDREN RECORD, USING MARKS THEY CAN INTERPRET AND EXPLAIN

Make sure the resources are available for children to extend and revisit the adult initiated experiences opposite.

Outdoors

Role play: cost of buying tickets for bus and train rides. Ice cream stall making labels for cost and using 1p coins to match prices and to buy the ice-creams.
Paying for repairs at the role play garage

Indoors

Snack café/shop: pay the appropriate coin or number of 1 p coins to access snack as part of the independent snack routines in place.

Role play: shops (food, pets, bakery, greengrocers, market stall, shoe shop etc.) writing price labels and paying using pennies and /or appropriate coins.
How much will this cost altogether?

[NRICH EYFS: Shopping](#)

Shape, Space and Measures

Children use everyday language to talk about size, weight, capacity, position, distance, time and money to compare quantities and objects and to solve problems.

They recognise, create and describe patterns.

They explore characteristics of everyday objects and shapes and use mathematical language to describe them.

Big Ideas

Awareness of shape: recognizing similarities and differences and distinguishing properties of shape....

Awareness of space: handling shapes and fitting them together

Progression in pattern; learning to

copy a pattern

continue a pattern

create a pattern

talk about patterns, compare and make predictions about what would come next

Key Mathematical Vocabulary

count, sort, group, set, list

pattern, puzzle, repeating pattern, next, after, before

bigger, larger, smaller

symmetrical

recognise, describe, make, build, draw, compare

2D shapes

rectangle (including square), circle, triangle

corner, side,

3D shapes

cube, pyramid, sphere, cone

face, edge, vertex, vertices

flat, curved, round, straight, solid, hollow,

Securing key skills and embedding understanding

Provide numerous informal, unstructured opportunities for children to explore geometric concepts through playing and **talking**.

Make sure that children experience 2D shapes in different orientations (posters and books often present squares and triangles in one orientation only).



Provide opportunities for children to compare; *What's the same? What's different?*

Precise use of mathematical language is very important and needs to be modelled correctly by adults.

Oblong, rectangle or square? A square is a member of the rectangle family – it has 4 right angles. It is a special rectangle because all its sides are equal. Rectangles which are not squares can be described as oblongs.

Activities Stories and Songs

Songs and Rhymes

Clap Your Hands and Wiggle Your Fingers...(now we've made a pattern!)

Sea Shape Song- Tom Thumb's musical maths

Mystery bag-Shape song-Tom's Thumbs Musical maths

Story Books:

Walter's Wonderful Web –Tim Hopgood

Captain Invincible and The Space Shapes -Stuart J Murphy

Aliens Love Underpants -Claire Freedman

Pants – Nick Sharratt

You Choose- Nick Sharratt

Links to NRICH activities provide suggestions of rich contexts for exploring mathematical ideas and developing mathematical skills and concepts They are linked to mathematical learning goals.

Shape, Space and Measures

They explore characteristics of everyday objects and shapes and use mathematical language to describe them.

Begin to use mathematical names for 'solid' 3D shapes and 'flat' 2-D shapes, and mathematical terms to describe shapes.

Select a particular named shape

Adult Initiated

3-D shapes

Identify solid shapes that can be seen around the school and in the classroom in the home corner or classroom shop; on a 'shape walk' around the school...

Start to become aware of some properties of solid shapes when looking at, talking about and comparing them:

Which shapes are hollow? Can you find a shape which has flat faces? Can you find a shape with a curved surface? Which shapes do you think will roll? Why?

Guess the name of a solid shape when it is covered with tin foil or wrapping paper, or placed in a cloth bag.

Make models using shapes that vary in shape, size and texture

Which shapes have you used to make your model? Why did you choose that shape for the wheels?

2-D shapes

Find similar shapes on faces of objects.

Where can we find circles in the shop? Can you match these lids to the jars or boxes?

Play Peeping Shapes;

Without using its name, describe a thin plastic shape hidden in a cloth bag.

My shape has three corners and three sides. What can it be? My shape is curved all the way round. What can it be?

Show a small part of the shape; *What shape might it be? Why? What shape can't it be? Why?*

Sort into trays a collection of varied flat shapes, either thin plastic shapes, paper shapes, drawn or stuck on card. *Tell me how you sorted the shapes? Can you sort them so that all the ones with three sides are together? Can you find all the shapes which are **not** square? Can you find the shapes which are **not** round?*

Sort or match scraps of fabric, or buttons. Identify which scraps of fabric have the same pattern? Which have stripes? Which have dots? Which have square checks? Which scraps, or which buttons, are the same shape? Which are the same shape/size

Enabling Environments –child initiated, adult supported

CHILDREN RECORD, USING MARKS THEY CAN INTERPRET AND EXPLAIN

Provide and make sure the resources are available for children to extend and revisit the adult initiated experiences opposite.

Outdoors

Large Construction: Discuss shapes used and made with different large hollow blocks when making a model. Which shapes have you used to make the roof etc?

Transient Art- Indoors and Out: Which shapes have you used in your picture? Which objects can you use to make a curve around the edge of the picture?

Treasure hunt- for 3D and 2D shapes

Indoors

Art area: using 2D and faces on 3D shapes to print pictures and make rubbings.

Making junk models. Which shapes have you used for your model. Why did you choose that shape for the wheels?

Role play: identify and talk about solid shapes and 2D shapes in play within the home corner- in the kitchen, in the shop etc. Can we use the flat face to stand them on the shelf?

In the post office, shop role play- wrapping solid shapes. What shaped box could you fit the present into?

[NRICH EYFS: Exploring 2D Shapes](#)

[NRICH EYFS: Shapes in a Bag](#)

[NRICH EYFS Making Footprints](#)

Shape, Space and Measures

They recognise, create and describe patterns

Use familiar objects and common shapes to create and recreate patterns and build models

Adult Initiated

Talk about and describe simple patterns, based on experience with patterns from different cultures: on ornaments, in necklaces and bracelets, on textiles, pottery, carpets...

Use sets of shapes, printing, collage, weaving, bead threading, computer programs or other media to make own repeating patterns such as: cotton reel, sponge, cotton reel, sponge...thumb print, palm, palm, thumb print, palm, palm...

Talk about, copy and continue repeating patterns of sounds or movements in music or dance, such as:
tap, tap, pause, tap... on the tambourine;
hop, hop, jump... in PE.

Make predictions, giving reasons for them.

Predict who will say 8 when counting round a circle of children.
Say what is hidden when an element in a pattern is covered up, or two elements are changed over.
My pattern has two circles, then two squares, then two more circles and two more squares, what will come next?

Make repeating patterns from bricks, beads cubes and natural objects such as pebbles, cones and shells:
Describe your pattern? Tell me which shapes you have used. Look at my pattern can you guess how I made it?

Go on a nature walk inspired by artist **Andy Goldsworthy**. Make patterns and take photographs to share and talk about.

Enabling Environments –child initiated, adult supported

CHILDREN RECORD, USING MARKS THEY CAN INTERPRET AND EXPLAIN

Indoors and Outdoors

Make sure there are resources and collections e.g. natural objects, open ended material etc. available for children to make comparisons and extend adult initiated experiences.

Outdoors

Washing line patterns: provide range of resources and pegs for children to make patterns. *Tell me about your pattern? What comes next?*

Music: tap out sound patterns with sticks using different pan lids, upturn buckets, the ground, a range of metal objects hanging on the fence/tree etc.

Transient Art indoors and outdoors): make patterns out of natural and found materials. *Describe your pattern? Tell me which shapes you have used. Look at my pattern can you guess how I made it?*

Indoors

Art area: using 2D and faces on 3D shapes to print wallpaper patterns for the home corner. Provide a range of familiar objects to print patterns.

Malleable area: using shapes, faces of objects make a repeating pattern. *My pattern has one circle, then two squares, then one more circle and two more squares, what will come next?*

Making patterns on the buns in the tray e.g. using range of objects or printing shapes on top

Sand area: making simple repeating patterns, in wet sand, using a range of shapes and faces of solid objects. *Tell me about your pattern?*

[NRICH EYFS: Making a Picture](#)

[NRICH EYFS: Tubes and Tunnels](#)

[NRICH EYFS: Building Towers](#)

This document has been created by the North Yorkshire Education & Skills mathematics team and members of the Early Years team to support practitioners in understanding the key elements of the early mathematical learning for young children.

We would like to thank Nrich for permission to use links to their resources for Early Years.