

BEST PRACTICE AND ACTIVITY IDEAS FOR MATHEMATICS IN THE EARLY YEARS FOUNDATION STAGE

Introduction

The suggestions for this area of learning should be read alongside the following:

- **Statutory Framework for the Early Years Foundation Stage** (DfE 2017)
- **Development Matters in the Early Years Foundation Stage** (Early Education 2012)
- **Teaching and Play in the Early Years - a balancing act?** (Ofsted 2015)

The ideas are intended to support learning and development for children in receipt of funding for the Early Years Free Entitlement for three and four year olds.

How children learn: the Characteristics of Effective Learning

Teaching and learning in the EYFS must be informed by these characteristics:

playing and exploring - children investigate and experience things, and 'have a go'

active learning - children concentrate and keep on trying if they encounter difficulties, and enjoy achievements

creating and thinking critically - children have and develop their own ideas, make links between ideas, and develop strategies for doing things

The suggested ideas should be integrated into a cycle of observation, assessment and planning where children's needs and interests are central to planning and provision.

Please note that the Early Learning Goals define the level of progress expected for children at the end of the EYFS, at the end of the Reception year.

Mathematics is one of the four specific areas of the Early Years Foundation Stage. The specific areas include essential skills and knowledge. They grow out of the prime areas and provide important contexts for learning.

Mathematics involves providing children with opportunities to develop and improve their skills in counting, understanding and using numbers, calculating simple addition and subtraction problems; and to describe shapes, space and measures. (EYFS DfE 2012)

This area of learning is divided into two aspects

1. Numbers
2. Shape, space and measure



Early Learning Goal for Numbers

NB This is the age related expectation for the end of the Reception year

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

Positive Relationships: The Role of the Adult



- to monitor all children's progress and ensure appropriate intervention and/or additional support is provided where needed
- to develop positive attitudes and dispositions towards learning in mathematics
- to plan a variety of play experiences, some of which will focus on mathematics and some of which will draw out the mathematical learning in other activities
- to model the use of mathematical understanding of abstraction by counting things that are not objects

- to provide a stimulating learning environment with a range of numerals displayed meaningfully
- to make good use of everyday activity to discuss mathematical ideas and to model mathematical language in a variety of contexts , for example, snack time
- to plan practical, enjoyable activities that develop mathematical understanding and the use of mathematical language
- to encourage active participation by children during group counting/singing activities, for example, acting out number rhymes supported with pictures and objects
- to provide opportunities for children to use mark making to support their thinking about numbers and simple problems in a range of contexts



- to provide real purposes for children to use mathematics in a practical way
- to participate in child initiated play, and encouraging their mathematical development in meaningful ways
- to develop children's thinking by showing an interest in methods not just solutions through talking to children about the strategies they are using
- to ask/plan questions using mathematical language that require children to think, solve problems and talk about processes
- to plan support for children who use a means of communication other than spoken English in developing and understanding mathematical language

Possible Activities

Practitioners should consider learning that can take place in everyday routines with meaningful reasons for children to count, which may include

- money and change in role play situations
- children taking turns daily to count how many children are present; numbers can be recorded on the whiteboard
- visual timetable: children can be encouraged to discuss sequence of the day's events, for example, what comes next .. before
- tidy up times: use of positional language, number, shape and space, matching, sorting, classifying, one to one correspondence; use of timer at tidy up times – doing it within a time limit
- preparing snack: one to one correspondence, estimating, counting, matching

- story props that children can use in their play (a range of stories support mathematical development)
- snack time: problem solving activities – how many cups will we need? Counting, sharing experiences, comparing quantity. Looking at patterns/shapes on plates, placemats, napkins, biscuits. Opportunities should be provided for children to separate objects into unequal groups as well as equal groups
- collections of interesting things to sort, order count and label
- a range of tactile numerals to supporting matching activities
- lining up: counting children ready for lunch/to go out to play, comparing line lengths, lining up in pairs (a good opportunity for counting in two's/pattern work)
- lining up in a pattern: boy/girl, red jumper/blue jumper
- children estimating how many children are present, say how many children would be here if one were away, etc.
- registration: self-registration procedures, for example, putting name on board on arrival to be counted with group; reception children may put name in a numbered pocket 1-30

Problem Solving Skills

Although problem solving is a feature of teaching and learning across all areas of learning, and is important within the Characteristics of Effective Learning, it is important that this aspect is not lost in mathematical development.

In mathematics children should be

- using their curiosity and questioning
- thinking logically
- making simple estimates and predictions
- solving simple problems/puzzles in a practical context
- sorting/matching objects, pictures or themselves, talking about decisions made
- talking about, recognising and recreating simple patterns
- interpreting information
- recording information in a variety of ways
- developing mathematical ideas and methods to solve practical problems



Opportunities should be planned for children to count, estimate, recognise numerals, record number, problem-solve, explore shape, space and measures in a range of mathematical and cross curricular activities. Practitioners should plan opportunities for children to experience the same mathematical concept in many different situations.

Possible activities

The following examples give some ideas for experiences and activities which may be planned to meet specific learning objectives.

- make a vertical number line with children. Use handprints they have made and number them, remembering to start at the floor. The number line can also be used as a height chart.
- devise a number walk in the local environment looking for house numbers, cars with numbers, prices in shops, numbers on buses, etc. Tally or put a counter in a tin everytime you see a dog/postbox/baby, etc. Take photographs of the numbers seen in the setting and local environment. These could be used for discussion/display or made into a book.
- create number trails in the environment – numbered footprints on the ground. Ask questions such as “How many footprints is it from the tree to the shed?”
- cover a cake tin and label the outside with numbers. Fill the tin with pegs. Children clip the correct number of pegs to the side of the tin.
- act out number rhymes with props. Take photographs of the children and make a book about the rhyme.
- record numbers for a purpose:
 - finding out how many children have had their milk
 - scoring for games, for example, skittles

- shopping lists
- recipes
- birthday cards
- telephone numbers
- making appointments in a role play situation
- making menus and price lists

Early attempts at recording numbers should be valued. There should be opportunities for children to record in a way that is appropriate for their stage of development, for example, when aiming bean bags in a bucket, children may record their score by using numerals, drawing beanbags, using tally marks, putting pebbles in a pot.



- recite number names in real life situations, for example, snack time, lining up
- share books involving numbers
- make up number stories: remember to consider one/two more or less
- share games involving counting and numbers
 - use number cards. Turn card over and clap the number. Extension: turn over two cards and clap the total.
 - what's missing? Put animals in field. Take turns to close eyes. Remove one or two creatures. What and how many are missing? How many left?
- make estimations during mathematical activities, for example, how many ping pong balls in the egg box or bears in the jar? How many pencils does this group need? When counting to check encourage older children to calculate one/two more or less
- draw attention to counting/calculating activities during role play:
 - lay the table with one cup, one saucer and one plate for each person etc. Calculate how many would be needed if one or two more people came
 - make price lists
 - create sorting activities, for example, shoes in shoe shop
 - give opportunities to record numbers, for example a message pad
- use small world equipment for counting and calculating:
 - How many pigs do you think will fit in the pen?
 - There are 3 people in the house, 2 in the garden. How many people altogether?
 - problem solving: Are there enough beds for the dolls?

- use construction kits for counting and calculating:
 - making towers of a given number. Calculating how many if one or two more are added or taken away
 - estimating how many blocks might be needed to make a road
- use sand play to develop mathematical concepts:
 - counting out given quantities, for example, sand pies
 - comparing quantities, for example, 'Are there enough flags for the sandpies?'
 - buried objects, for example, children record how many fir cones, shells etc, they found in the sand
 - buried numerals, for example, Can the children find/match a numeral by touch?
 - writing numbers in sand
 - collect treasure from the sand and put in pots: How many?
- use water play to develop mathematical concepts:
 - comparing quantities, for example, Are there enough sailors for each boat?
 - estimating how many cups of water needed to fill a container
 - estimating/comparing number of objects that were caught in fishing net
- use the outdoor environment to develop mathematical concepts:
 - counting physical movements (use of dice)
 - using small apparatus: counting bounces, aiming beanbags into hoop with numeral attached, recording scores
 - playing skittles, recording scores
 - making collections and counting, comparing quantities., for example, conkers, leaves etc
- play dice games:
 - roll the dice and perform that many actions/find that many objects
- use the number line/washing line for number activities:
 - find the missing number, change two numbers around
- use computer software to develop mathematical concepts, for example, using software to match numerals to sets of objects
- use creative activities to develop mathematical concepts:
 - making dough/clay models, for example, birthday cakes with correct number of candles on
- cooking activities:
 - estimating, counting ingredients
 - problem solving, for example, dividing cake between a number of children

The Learning Environment

The learning environment includes indoor and outdoor provision. Child initiated play will be enhanced by adult support **when appropriate** to support and extend children's learning.



Provide

- interactive displays with a mathematical theme; this might include collections of objects for sorting, matching, counting, estimating, measuring, etc. The display may be linked to a topic, story, rhyme, etc.
- number lines:
 - using photographs of children
 - using real objects
 - using numerals made from sandpaper
 - longer number lines to support more able children
 - posters/charts with numbers on
- a variety of number games – indoors and outdoors
- large and small construction to support mathematical development
- number poems and rhymes, for example, in listening area (include other languages)



- props for children to act out number rhymes

- number signs where appropriate, for example, number on house
- outdoor markings, for example, hopscotch, number tracks, targets
- calendars
- birthday charts
- height charts
- number puzzles
- numerals, for example, wooden, plastic, foam, magnetic
- threading activities
- sorting and matching games
- technological appliances with numbers on, for example, calculators, computers, robots, tape recorders, clocks, watches, alarm clocks, digital clocks, shop till, thermometers, telephones
- books, catalogues, telephone books, recipe books, registers
- water play, for example, with props for '5 Little Speckled Frogs'
- sand play, for example, with numeral moulds in wet sand
- malleable materials
- role play offering mathematical opportunities, for example, matching one to one, counting money
- make and do area, for example, pots marked with number of scissors
- creative activities offering mathematical opportunities, for example, painting pictures of 3 bears with 3 bowls/beds/chairs
- computer software offering mathematical opportunities for counting/number recognition/calculating
- programmable toys
- blocks and bricks
- small world play, for example, sorting/counting farm animals

The above opportunities can be made available to children to initiate their own play. Adults should be available, when appropriate, to support and extend children's mathematical development and to support children in identifying the need for counting and number.



Early Learning Goal for Shape, Space and Measure

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.

Possible activities

The following examples give some ideas for experiences and activities which may be planned.

Opportunities should be planned for children to count, estimate, recognise numerals, record number, problem-solve, explore shape, space and measures in a range of mathematical and cross curricular activities.



Practitioners should plan opportunities for children to experience the same mathematical concept in many different situations.

- share books involving shape, space and measures
- make up their own stories involving shape, space and measures
- go on shape and pattern walks:
 - children look for shapes and patterns in their setting and local environment
 - children look for directions and arrows etc
- play games involving shape, space and measures:
 - make repeating sound patterns with claps or jumps
- use role play to develop mathematical concepts:
 - designing role play area – how to use space, what fits where
 - exploring changing shape when folding blankets, tablecloths, napkins
 - using positional language when arranging furniture
 - dressing up using language of measures
 - ordering, for example, in '3 Bears house', ordering different sizes of bowls, spoons, chairs etc.
 - pouring drinks in café using the language of full/empty

- weighing activities, for example, dolls at the clinic, food
- use 'small world' play to develop mathematical concepts:
 - making patterns with cars, for example, red, blue, red, blue, etc
 - using positional language when arranging furniture in dolls house
 - using directional language when playing with road maps, etc
 - comparing and ordering size, for example, height of fences
 - making homes for animals to fit into
- use construction kits to develop mathematical concepts:
 - exploring the best 3D shapes for building constructions, for example, Can you build with spheres?
 - making a drawn plan for a model
 - drawing a picture of a model
 - exploring ramps
 - comparing/ordering length, for example, roads, tracks
 - playing 'Find a Shape' – choose a 3D shape and find something that is the same shape



- use sand play to develop mathematical concepts:
 - buried shapes – making impressions in sand – Can they guess the shape? Can the child identify/match shape by touch?
 - exploring line patterns in sand
 - comparing/ordering size, for example, sandpies
 - exploring balance in sand tray (using a balance)
 - exploring rates of speed, for example, making sand go faster

- use water play to develop mathematical concepts:
 - estimating/comparing measures
- use the outdoor environment to develop mathematical concepts:
 - exploring space, mathematical language with obstacle courses
 - experiencing moving quickly, slowly, with little steps, big strides
 - exploring line/direction
 - making shapes with bodies
 - mirroring actions
 - ring games
 - exploring direction, space with wheeled toys
 - exploring rates of speed, for example, moving toys, running
- play dice games:
 - roll a shape dice. Find/say the name of something the same shape.
- use computer software to develop mathematical concepts:
 - using software to draw lines, shapes
- use creative activities to develop mathematical concepts:
 - making dough/clay models, for example, making shorter or longer worms
 - making shapes using cutters
 - printing activities, for example, choosing a printing object to produce a particular shape or line
 - making symmetrical patterns
 - making line drawings by drawing, printing, painting
 - making pattern by drawing, painting, printing
 - making patterns using various tools in clay
 - painting families of same shape in different sizes
 - junk modelling using a variety of shapes
 - covering boxes with paper/discussing area, wrapping parcels, guessing contents
 - exploring tempo, for example, making body sounds, playing instruments slowly/quickly etc, making patterns/copying patterns
- take part in cooking activities:
 - measuring ingredients – weighing, balancing, pouring out cupfuls, etc
 - using different shape cutters
 - decorating cakes with different shapes
 - sequencing experiences

The Learning Environment

The learning environment includes indoor and outdoor provision. Child initiated play will be enhanced by adult support **when appropriate** to support and extend children's learning

Provide

- interactive displays
- a visual timetable
- posters
- a variety of maths games – indoors and outdoors, for example, shape matching
- large and small construction to support mathematical development
- poems/rhymes with a mathematical theme
- two and three dimensional work with a range of materials
- outdoor markings – patterns and shapes
- calendars
- birthday charts
- height charts
- threading activities
- sorting and matching games
- technological appliances, for example, robots, clocks (watches, alarm clocks, digital clocks, timers), shop till, scales
- water play
- sand play, for example, with shape moulds
- malleable materials
- role play offering mathematical opportunities
- 'make and do' area
- creative activities offering mathematical opportunities, for example, printing with shapes and assorted items
- computer software offering mathematical opportunities
- programmable toys
- wooden blocks and bricks (ensure children are involved in the sorting/tidying of these for experiences in estimating size/shape, area, capacity, tessellation of shapes, etc)
- small world play which provides opportunities to develop mathematical skills and concepts – language of position, measure, shape and classification
- boxes and materials in different shapes and sizes for model making
- paintbrushes and tools in various sizes to promote discussion about thick and thin
- box containing items such as standard/non-standard tape measures, clipboards, paper and pen for drawing sketches of models