

UPDATED SEPTEMBER 2017

## Monitoring and Tracking Progress in ELC Numeracy and Mathematics

Incorporating Education Scotland 'Numeracy and Mathematics Benchmarks'  
and the City of Edinburgh Council's 'Numeracy Assessment and Planning Tracker'.



### Context

Education Scotland has placed a greater emphasis on planning for progression and expect ELC settings to have a clear strategy for the development and assessment of children's numeracy skills to ensure smooth progression and achievement. This tool will enable you to do this. The skills are based on the 'Numeracy and Mathematics benchmarks – Early Level. This should help you to make clear informed decisions about children's progression.

## Guidelines for completing this tool

- This tool should be completed by practitioners over the course of a child's time in their ELC setting.
- As a guide, children's progress should be updated in the June of their first year of ELC and in the December and June of the child's second year of ELC. However, it is up to each individual unit to decide how often they track individual children's progress
- The tracker will be passed onto the receiving primary school as part of the transition process.
- Information should be gathered over time generally through observation, although sometimes practitioners may need to set up a specific small group or individual activity to fully assess a child's progress.
- An overview of the child's progress in each area should be given in the 'date' boxes. Practitioners should ensure that the boxes in all areas are completed prior to the child moving to primary one.
- It is important to involve parents in this process and share the information with them. This could be done through sharing progress within each child's PLP.
- Practitioners should be mindful of a child's additional support needs when completing the tool and ensure they fully capture the skills a child shows. Any activities to measure a child's skills should be adapted in line with their particular needs e.g. allowing a child to indicate a response by pointing or gesture if their language skills are delayed.

A key for indicating a child's progress within the skill could be used as follows:

Level of Skill	Coding
Has engaged in some experience of the skill	1
Skill is shown sometimes but is not consistent yet	2
Skill is shown regularly and spontaneously	3



## Next steps and using this tool in your practice

- Practitioners should use the information collected using this tool to plan next steps in a child's learning and to monitor their progress on an ongoing basis. The tool should also be used to plan focussed learning experiences based on the experiences and outcomes to provide progression, depth and challenge.
- Evaluate children's progress through effective observations on an ongoing basis through short, concise notes to help planning for next steps in learning.
- By completing the tool on several occasions practitioners should be able to gain a picture of the child's progress over time.
- Moderate assessment judgements through discussing standards and the progression of individual children. This can be done at weekly team meetings and from time to time with colleagues from other establishments to ensure a shared understanding across settings
- If a child is showing early development in a lot of areas, but is not making progress over time or practitioners have other concerns about their development, consider involving relevant support services such as Health Visitor, Speech and Language Therapy Service, Area Principal Teacher, Educational Psychology Service.
- It is very important that this tool is used appropriately to track each child's progress and plan effective and meaningful next steps. It should not be used to 'tick off' all of the Experiences and Outcomes (Es and Os) separately – as stated in Education Scotland's 'Curriculum for Excellence – A Statement for Practitioners from HM Chief Inspector of Education' (August 2016)
- The tool has been designed to track progress within the 'Curriculum Organisers' for Numeracy and Mathematics to ensure practitioners are not tracking and recording progress against individual Es and Os':
  - Estimation and rounding
  - Number and number processes
  - Fractions, decimal fractions and percentages
  - Money
  - Time

Numeracy overviews should be included in each child's PLP as a summary of progress and achievement and to identify next steps in learning. The tool should also be used to support transition.

The tool should be used as part of the 'Learning and Development Framework 0-5 Years' (incorporating the Developmental Milestone Tool)

Thanks to City of Edinburgh Council.

## Developing Early Maths Through Play

Children's experience of early mathematics begins at home. In and around the home children are involved in a variety of early mathematical activities and their awareness of number and its importance is developed through everyday activities in family life such as shopping, setting the table or cooking. These are rich mathematical contexts which introduce them to a variety of mathematical concepts and can give a secure basis on which to build their future skills.

Before starting school or nursery many children can already:

- Count
- Recognise numerals
- Represent quantities
- Share things out
- Sort and match items
- Understand the language for comparing and ordering objects
- Do very simple addition and subtraction

For young children learning is holistic and not divided into subject headings. They encounter mathematical concepts as part of the whole process of finding out about and making sense of the world around them. As with everything else children's knowledge and understanding has to be based on experiential learning using their senses to explore the concrete world before they can deal with abstract ideas.

Children have individual experiences and interests and learn at different rates. But the way they learn follows a similar pattern as they:

- Explore the world around them
- Discover patterns in what they see and do
- Repeat actions and test the patterns they have recognised
- Add their new understanding to what they already know about what the world is like and how it works
- Use words to make clear what they know



## Why Play?

One of the most powerful and self-motivating contexts for early mathematics is play. Through play children can repeat, rehearse and refine skills, using skills already gained and practising new skills.

Learning maths through play offers several advantages:

- It has a purpose – it's fun!
- It is set within a meaningful context
- It gives the child responsibility and control
- It provides time to repeat, practise and gain mastery
- It is a practical activity and natural to young children's holistic learning

Through well-planned play children are continually:

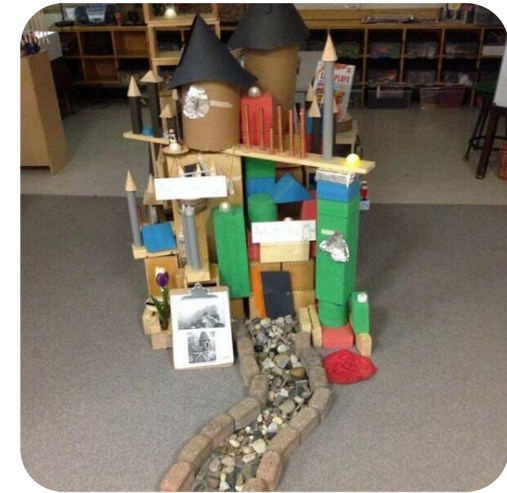
- Making decisions
- Imagining
- Reasoning
- Predicting
- Planning
- Experimenting with strategies
- Recording

All these processes, integral to play, are essential for mathematical thinking.

The best learning starts with the interests of the child and provision for children should be based on an understanding of how children learn maths. It is important that maths experiences are meaningful to children and not abstract ideas and concepts unrelated to children's previous experiences. Children have to make meaning and connections with other aspects of the world around them.

Practitioners need to recognise the powerful contribution that play makes to children's learning and take advantage of play situations to ensure that opportunities to develop maths ideas and skills are available daily.

We also must ensure there is a balance between adult-directed activities and child-initiated play. It is important to introduce children to new concepts and ideas in small groups or individually but then allow them to consolidate their learning through free flow play activities.



## Creating a Maths Rich Environment

Creating a stimulating, learning environment that offers a rich variety of experiences for all children is central to high quality provision.

Practitioners should ensure that the playroom offers play opportunities for children to:

- Develop powers of observation using the senses
- Recognise patterns, shapes and colour
- Be aware of daily time sequences, identify and use numbers
- Sort and categorise things into groups
- Count
- Recognise some properties of materials such as hard / soft / rough / smooth
- Solve problems
- Use words to describe measurement
- Collect, organise, display, interpret

Resources may vary in different settings. Nevertheless there will be a wide range of resources that children can use to develop their mathematical skills. To support organisation of resources, many centres set up a maths area but there can be opportunities to promote the development of maths skills in all areas of the playroom.

Possible resources:

### **For sorting, classifying, ordering and counting:**

shells, pebbles, cars, shapes, buttons, pegs, plastic numbers, cotton reels, boxes, feathers, keys, shiny gift bags, fir cones, sorting circles, sorting trays, conkers, baskets, cubes

### **Exploring pattern and shape:**

tap-tap shapes, pegs, pegboards, linking chains, laces and beads, beads and ribbons, building blocks, shape sorters, magnetic shapes and numbers, shape / pattern games.

### **For measuring:**

rulers, number lines, balances, scales, tape measures, stop clocks, sand / water timers, graded containers, height charts

### **Number**

dominos, counters, dice, board / track games, number snakes, cubes, calculators, an abacus, number lines, magnetic numbers, painted stones / wooden discs

Routines and storage systems can significantly influence children's mathematical learning. For example in the home corner:

- Kitchen equipment is more appealing if hung along the wall for the children to match this will enable children to develop their understanding of shape, size and colour.
- Templates can also be used on horizontal surfaces for matching activities with cups and plates
- Numbered egg cups and eggs will encourage one-to-one correspondence and number ordering
- Routines such as knocking four times as you enter the home corner will encourage counting
- Where appropriate, resources should be 'real' – eg real crockery, pots and pans as opposed to plastic toys

It is important to give children lots of opportunities to see and use numbers around the playroom. Visual displays of numbers that are meaningful promote the recognition of the numerals and number order. Where appropriate, use environmental numbers and shapes – eg road signs, numbers on houses, shapes in the environment.

Number lines can be created through displays, with real objects, on doors, trays, with photographs on 'washing lines' and on shapes or signs.

Examples are:

- Cover small tubs with plain paper and label each with a number. These can then be hung from hooks on the wall. Leave a tray of objects, relevant to the current context for learning, for children to count into the tubs.
- Create number trails of large footprints across the floor. These can also be used as pathways to areas within the playroom. E.g. 'how many footprints is it to the sand tray?'
- Resource trays or boxes can also be labelled with numbers for the children to recognise. 'Can you put this back in the tray with number 6 on it?'
- Wheeled toys can be numbered and the bays they are to be 'parked' in.
- Cover a biscuit tin and label it with numbers (Tins that are hexagonal in shape are good as they have flat sides). Fill the tin with clothes pegs and the children have to clip pegs to the edge of the tin matching the correct number of pegs to the correct label.

Number Rhymes and Songs are plentiful and support counting forwards, backwards, addition and subtraction.

Remember it is important to find ways of making the children aware of the concept of number during rhyme activities by having concrete examples available e.g. five toy ducks for the 'Five Little Ducks' rhyme.

It is also useful to create maths boxes or sacks based around a rhyme for children to take home and share with parents.



Children should also be given meaningful reasons for writing numbers. For example:

- Collecting information, such as how many children have had their snack
- Scoring for games
- Number plates for wheeled toys
- Shopping lists and price labels
- Recipes
- Telephone numbers
- Appointment times in the doctor's surgery
- Menus and price lists in the café
- Tickets for buses and trains



Any early attempts at writing numbers should be valued and encouraged.

Providing opportunities for children to add and take away objects can develop the concepts of addition and subtraction. For example, only five children in the group have drinks how many more do we need? How many cups altogether? One child has finished we can take the cup away, how many are left?

Children enjoy ordering, sorting and matching objects as part of their play. In the small world area they will sort and classify furniture, model animals and cars in a variety of ways, by colour, shape, size and purpose. There are lots of commercially produced resources for sorting but 'real' objects such as leaves, pebbles, feathers etc are just as exciting to young children.

Opportunities to develop children's ability to recognise pattern and sequence should be provided in all curricular areas, for instance, shape and design in the construction area, shapes and patterns made by words, shapes and patterns made by dough, creativity in art and craft and movement sequences in physical play.

Measuring activities can support children's understanding of weight, length, time, volume and capacity. The sand and water trays are ideal resources to provide purposeful play and develop their language and understanding of this concept.

Children should be encouraged to recognise coins by looking at the different colours and shapes. Opportunities to use money and develop an understanding of the purpose of money can easily be provided through a range of contexts in the role-play area.



## The Role of the Adult

Adults have a crucial role to play in developing children's mathematical thinking and language. Conversations should introduce new vocabulary and create challenges and problems for the children to solve.

The adult role includes:

- Modelling appropriate talk and a range of vocabulary by putting children's actions into words. E.g. 'I can see you are making a long row of cars.....now you're adding one more. How many are you going to add?'
- Modelling the use of numbers and counting in everyday situations.
- Writing numerals for a range of purposes.
- Effective questioning to develop, extend and sustain children's play. E.g. 'What shall we do now?' 'What if we tried filling up this bottle?' 'I wonder what will happen if we add one more?'
- Encouraging children to think out loud as they take part in mathematical activities. E.g. 'I wonder if those will fit in there?' 'Will the lid still fit on?' 'What do you think?'
- Recognition of individual learning skills and planning for both more focused adult- led activities and providing the resources to enable high quality child-initiated play that extends learning.

To develop children's problem solving and thinking skills, adults have to stretch children's thought processes by encouraging them to be creative in thinking up solutions and identifying problems in all areas of learning. Children should be encouraged to make links between previous experiences and learning, and new problems or challenges.



## Planning for Mathematical Play

Observing children at play and recording observations of children's skills, understanding and previous experiences will help to inform future plans. Once we have identified the next steps in learning for children we can then consider how these might be addressed creatively, and which play opportunities and resources can be offered to support them. When establishing a creative context for learning we may ask ourselves the following questions:

- What are our mathematical learning intentions to enable children to extend their learning?
- What are the children's current interests or the current outcomes for learning?
- What mathematical opportunities does this offer? (What could the children measure, count, weigh, make patterns with or buy? What information could they find out and what problems could they solve?)
- What links are there with other areas of the curriculum and previous experiences? (Will they be exploring materials or growing things? Will they be listening to a poem, story or song? Will they be finding out about other places or people?)
- Will this stimulate independent play in a variety of contexts both indoors and outdoors?
- What resources are needed and how might the children use these resources?
- What enquiry and key questions will stimulate play and promote learning?
- Do the activities encourage co-operative learning and talk amongst the children?

The well-resourced ELC setting contains a rich variety of activities and opportunities, which will have the potential to stimulate young children's mathematical development. It is the adult's role to recognise the mathematical potential of each activity, resource and situation and to structure it so it's engaging and learning does take place.



## Engaging Parents

Parents are children's first and continuing educators. It is important to build real partnerships based on two-way conversations between home and ELC. We must regularly share children's significant achievements with parents, our planned programmes of activities and learning intentions to support next steps in learning. In this way we can encourage parents to engage in their child's learning by recognising and making the most of the rich mathematical opportunities that can arise in everyday life.

# Early Level Learning and Development: Numeracy: Number

## Number and number processes: Concept of zero, Counting

I can explain that zero means there is none of a particular quantity and is represented by the numeral '0'.

I can count starting at zero.

When counting, I understand that the number name of the last object counted is the name given to the total number of objects in the group.

I can count on in ones from a given number.

I can count back in ones from a given number.

I can hold a number in my head and count on.

I can add two groups (sets) together.

I can take some away and count how many are left.

## Number and number processes: Number recognition, Ordering numbers

I can recognise numbers in the environment and understand and use them in conversation.

I can recognise and identify the number symbols to 5.

I can recognise and identify the number symbols to 10.

I can recognise and identify the number symbols beyond 10.

I can order numbers to 5.

I can order numbers to 10.

I can order numbers beyond 10.

I can tell which number(s) comes before or after a number.

## Fractions, decimals and percentages Estimation and rounding

I can count a set of objects using 1:1 correspondence to 5.

I can count a set of objects using 1:1 correspondence to 10.

I can count a set of objects using 1:1 correspondence beyond 10.

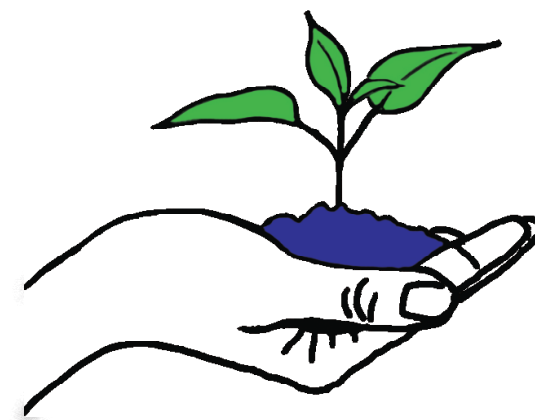
I can share a collection of objects equally.

I can recognise the number of objects in a small group, without counting.

## Learning At Home

1. Sing and say number rhymes together.
2. Count at home – eg number of plates needed for dinner time
3. Count the steps / stairs at home
4. When you are out a walk or in the car/bus, play a game of 'spot the number'
5. Use the language of size when you can – 'is my bowl bigger or smaller than yours?'

### Count Together!



## Data and analysis Patterns and Relationships

- I can recognise patterns in my world.
- I can copy patterns.
- I can complete patterns.
- I can create my own pattern.
- I can record information in a variety of ways.
- I can explain and justify the ways in which I have sorted.
- I can use the signs and charts around me for information.

## Properties of 2D shapes and 3D objects Angles, symmetry and transformation

- I can sort 2D objects by sight and touch.
- I can sort 3D objects by sight and touch.
- I can recognise and name a variety of 2D objects.
- I can recognise and name a variety of 3D objects.
- I can create a symmetrical picture by folding.
- I can understand and use the term “the same” while making symmetrical pictures.
- I can use the term “symmetrical” while making symmetrical pictures.
- I can use positional words to describe where things/people are.
- I can respond to and use vocabulary to describe a movement or journey e.g. up/down/across.

## Money, Time, Measurement

- I can recognise and name different coins.
- I can use appropriate coins to buy something.
- I can order and talk about my day and events in my life.
- I can use the words yesterday, today and tomorrow when discussing time.
- I can name the days of the week and I know their order.
- I know that there are 4 seasons and can name them.
- I can put objects in order according to length.
- I can put objects in order according to weight.
- I can use a variety of objects to measure length.
- I can use a variety of objects to measure weight.
- I can use the language of measure to describe what I have found out.

## Learning At Home

1. Provide opportunities for your child to pay for items when shopping
2. Make a chart showing the days of the week
3. Spot different shapes around the home and on the way to nursery
4. Encourage your child to measure at home using a ruler, scales, measuring tape
5. Bake a cake!

### Measure Together!



ELC Numeracy & Mathematics - Number Progress Tracker -Name:

Curriculum Organisers	Experiences and Outcomes	Skills	June Progress	Dec/Jan Progress	June Progress
<p><b>Number and Number Processes</b></p> <p><i>Number recognition</i></p> <p><i>Ordering Numbers</i></p> <p><i>Concept of zero</i></p> <p><i>Counting numbers</i></p>	<p>I have explored numbers, understanding that they represent quantities, and I can use them to count, create sequences and describe order <b>MNU 0-02a</b></p> <p>I use practical materials and can 'count on and back' to help me understand addition and subtraction, recording my ideas and solutions in different ways <b>MNU 0-03a</b></p>	I can recognise numbers in the environment and understand and use them in conversation			
		I can recognise numbers in the environment and understand and use them in conversation			
		I can recognise and identify the number symbols to 5			
		I can recognise and identify the number symbols to 10			
		I can recognise and identify the number symbols beyond 10			
		I can order numbers to 5			
		I can order numbers to 10			
		I can order numbers beyond 10			
		I can tell which number(s) comes before or after a number			
		I can explain that zero means there is none of a particular quantity and is represented by the numeral '0'			
		I can count starting at zero			
		When counting, I understand that the number name of the last object counted is the name given to the total number of objects in the group			
		I can count on in ones from a given number			
		I can hold a number in my head and count on			
		I can add two groups (sets) together			
		I can take some away and count how many are left			
		I can count backwards from 5			
		I can count backwards from 10			

ELC Numeracy & Mathematics - Number Progress Tracker -Name:

Curriculum Organisers	Experiences and Outcomes	Skills	June Progress	Dec/Jan Progress	June Progress
<b>Estimation and rounding</b>	I am developing a sense of size and amount by observing, exploring, using and communicating with others and things in the world around me. <a href="#">MNU 0-01a</a>	I can count a set of objects using 1:1 correspondence to 5			
		I can count a set of objects using 1:1 correspondence to 10			
		I can count a set of objects using 1:1 correspondence beyond 10			
		I can understand that 2 halves make a whole			
		I can recognise the number of objects in a small group, without counting			
<b>Fractions, decimal fractions and percentages</b>	I can share out a group of items by making smaller groups and can split a whole object into smaller parts. <a href="#">MNU 0-07a</a>	I can share a collection of objects equally			

ELC Numeracy & Mathematics – Measure Progress Tracker – Name:

Curriculum Organisers	Experiences and Outcomes	Skills	June Progress	Dec/Jan Progress	June Progress
<b>Money</b>	I am developing my awareness of how money is used and can recognise and use a range of coins <u>MNU 0-09a</u>	I am developing an awareness of how money is used in real life			
		I understand that coins have different values			
		I can recognise the value of some coins			
		I can use a variety of coins in real life contexts			
<b>Time</b>	I am aware of how routines and events in my world link with times and seasons, and have explored ways to record and display these using clocks, calendars and other methods <u>MNU 0-10a</u>	I can order and talk about my day and events in my life			
		I can use the words yesterday, today and tomorrow when discussing time			
		I can name the days of the week and I know their order			
		I know that there are 4 seasons and can name them			
<b>Measurement</b>	I have experimented with everyday items as units of measure to investigate and compare sizes and amounts in my environment, sharing my findings with others. <u>MNU 0-11a</u>	I can put objects in order according to length			
		I can put objects in order according to weight			
		I can use a variety of objects to measure length			
		I can use a variety of objects to measure weight			
		I can use the language of measure to describe what I have found out			

ELC Numeracy & Mathematics – Shape, Pattern and Information Handling Progress Tracker – Name:

Curriculum Organisers	Experiences and outcomes	Skills	June Progress	Dec/Jan Progress	June Progress
<b>Properties of 2D shapes and 3D objects</b>	I enjoy investigating objects and shapes and can sort, describe and be creative with them <b>MTH 0-16a</b>	I can sort 2D objects			
		I can sort 3D objects			
		I can recognise and name a variety of 2D objects			
		I can recognise and name a variety of 3D objects			
<b>Angles, symmetry and transformation (Positional language)</b>	In movement, games and using technology I can use simple directions and describe positions. <b>MTH 0-17a</b>	I can use positional words to describe where things/people are			
		I can respond to and use vocabulary to describe a movement or journey e.g. up/down/across.			
	I have had fun creating a range of symmetrical pictures and patterns using a range of media <b>MTH 0-19a</b>	I can create a symmetrical picture by folding			
		I can understand and use the term “the same” while making symmetrical pictures			
		I can use the term “symmetrical” while making symmetrical pictures			
<b>Patterns and Relationships</b>	I have spotted and explored patterns in my own and the wider environment and can copy and continue these and create my own patterns. <b>MTH 0-13a</b>	I can recognise patterns in my world			
		I can copy patterns involving objects, shapes and numbers			
		I can complete patterns involving objects, shapes and numbers			
		I can create my own pattern involving objects, shapes and numbers			
<b>Data and analysis</b>	<b>MNU 0-20a</b> I can collect objects and ask questions to gather information, organising and displaying my findings in different ways <b>MNU 0-20b</b> I can match objects and sort using my own and others’ criteria, sharing my ideas with others. <b>MNU 0-20c</b> I can use the signs and charts around me for information, helping me plan and make choices and decisions in my daily life.	I can record info in a variety of ways			
		I can explain and justify the ways in which I have sorted			
		I can use the signs and charts around me for information			