Glasgow Counts in our Playrooms

THE SCOTTISH ATTAINMENT CHALLENGE
LITERACY NUMERACY
HEALTH & WELLBEING

Glasgow's Improvement Challenge
Unlocking Learning

Professional Learning gtc SCOTLAND 2018 EXCELLENCE AWARD

Overview and Framework Session 1
2023 - 2024
LEL Team

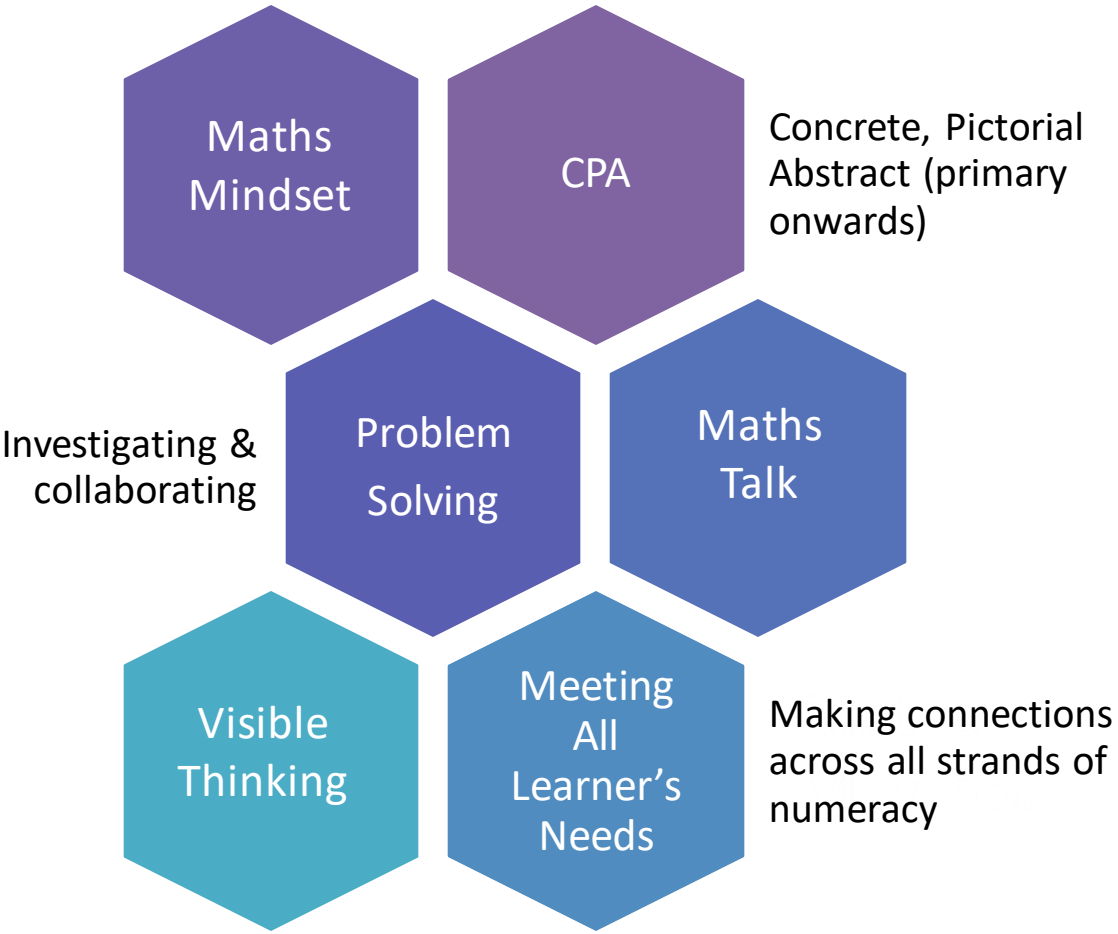
Aims

To explore mathematical mind-sets

To explore what high quality provisions look like in early years establishments

To familiarise ourselves with the Glasgow Counts Framework

Our key messages:



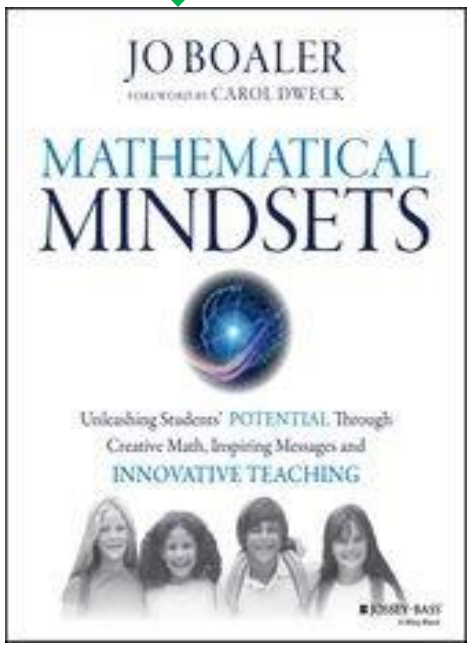
Video 1 Video 2

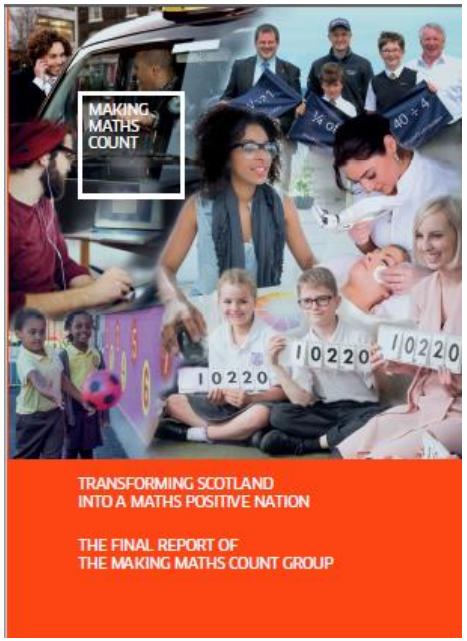
Mathematical Mindsets

To explore mathematical mind-sets

Mathematical Mindsets

Theory into Practice



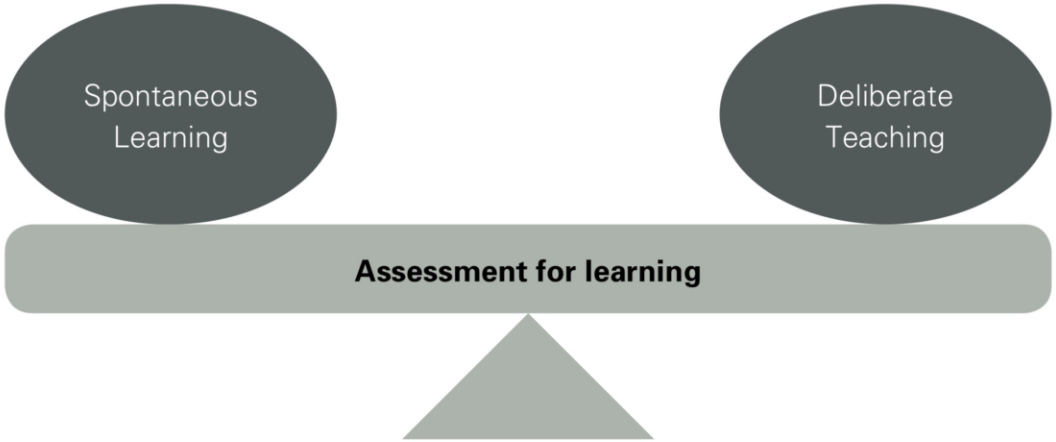


Improving confidence and fluency in maths for children, young people, parents and all those who deliver maths education to raise attainment and achievement across learning.

All schools and nurseries should use a wide range of effective learning and teaching approaches to promote positive attitudes and develop high expectations, confidence and resilience in maths.

What does high quality provision look like in early years establishments?

Balancing spontaneous learning with intentional teaching



New Zealand Government, Early Mathematics:
A guide for improving teaching and learning, 2016

"A balance of responsive and intentional planning is essential in providing suitable experiences that connect with and extend children's interests and motivations."
p 63 Realising the Ambition

What does quality provision look like?

"Numeracy should be embedded throughout the curriculum and the environment and should not simply be seen as an area on it's own."
Realising the Ambition p75

High Quality Provision

High Quality Provision

High Quality Provision

High Quality Provision

High Quality Provision

High Quality Provision

Would a dedicated numeracy area work well in your establishment??

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0 1 2 3 4 5
Shapes

Self evaluation

Challenge questions

1. To what extent do you have a clear picture of every child in your group as a mathematician with knowledge of what went before, is happening now and next steps?
2. Are most of the learning experiences children have in mathematics in your centre planned or spontaneous?
3. What play situations have you found are the most effective at stimulating mathematical conversations and learning?
4. How do you cater for children's interests when engaging children in challenging mathematics?
5. To what extent do you feel confident in your knowledge of the maths curriculum and spotting opportunities for learning?

Numeracy Evaluation Tool/Audit

Early Years Numeracy Rich Learning Environment Toolkit

Numeracy Rich Environments

Children's numeracy and mathematical learning can thrive when surrounded by attuned adults and enabling environments that are rich and diverse i opportunities for developing understanding of number, numeral recognition, counting, sorting, patterning, measuring and problem solving. A numeracy ric environment emphasises the importance of using ***interactions, experiences*** *and* ***spaces*** *effectively to facilitate high quality numeracy and mathematics opportunities.*

Practitioners in high quality provision:

- *highly value and promote child-initiated experiences and provide spaces to capitalise on children's interests and motivation.*
- *tune in to child-initiated activity and sensitively intervene to extend children's inquiry, problem solving and thinking skills.*
- *extend learning based on an understanding of developmental stage and interests, rather than providing adult directed activities that have little meaning for children.*
- *enable children to lead their own learning, including planning projects and solving their own problems.*

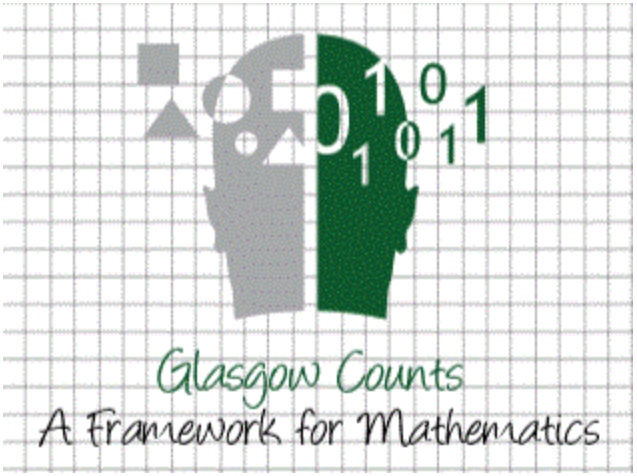
Realising the Ambition (2020), p.83

Using the Toolkit

- *This Numeracy Rich Environment Toolkit can be used to help you and/or your team evaluate the experiences, interactions and spaces within you establishment.*
- *Use your evaluation to plan for identified areas of development.*
- *This toolkit is not intended to be used in its entirety at the one time, rather to focus on one or more concepts of numeracy and mathematics. This ma be linked to an improvement plan outcome or development need you have identified. For example, if you are focusing on developing counting skills, yo may first use the awareness of number paper to identify where you are and how you know, then plan next steps or actions in order to improve th*

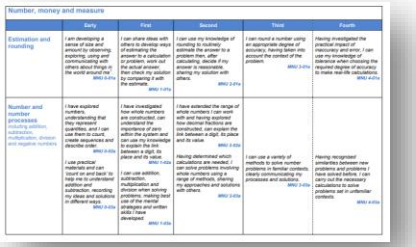
DRAFT

The Framework



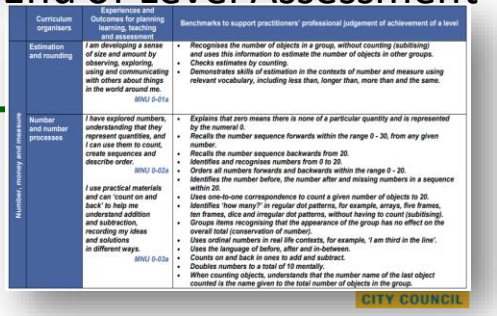
Making the Links

Plan Using Experiences and Outcomes to ensure Curriculum Coverage.



Awareness Of Number – Counting, Quantities & Number Structure							
Estimation & Rounding	Knows they can check estimates by counting within 0-10		Can apply subitising skills to estimate the number of items in a set		Uses the language of estimation, including more than, less than, fewer than and the same		
No. word sequences	Say short forward and backward number word sequences within 0-10		Uses ordinal numbers in real life contexts e.g. I am first/second/third in the line'		Recalls the number sequence forwards and backwards within 0-10		
Numerals	Recognise numerals e.g. points to the number from 0-10	Identify (name) numerals e.g. can respond to question 'what is that number?' from 0-10	Explains zero is represented as 0	Orders numerals forwards and backwards within 0-10	Identifies number before, after and missing numbers in a sequence within 0-10; beginning to use the language before, after and in-between		
Subitising	Identifies 'how many?' in regular dot patterns e.g. dot arrangement/on fingers/five frames/10 frames/dice without counting up to 6		Identifies 'how many?' in irregular dot patterns e.g. dot arrangement/on fingers/five frames/10 frames/dice without counting up to 6		Represents amounts in different arrangements e.g.dot arrangement/on fingers/five frames/ 10 frames/dice without counting up to 6		
Counting	When counting objects understands the order in which we say the numbers is always the same (stable order)	Touch counts one item when each number word is said (1-to-1 correspondence)	When counting objects understands that the number name of the last object counted is the name given to the total number of objects in a set (cardinal principle)	When counting objects understands that the number of objects is not affected by position (order irrelevance)	Counts objects in a set recognising that the appearance of the objects has no effect on the overall total within 0-10 (conservation)	Counts anything e.g. objects at a distance/in a book/sounds/claps within 0-10 (abstract principle)	
Place Value	Explains that zero means there is none of a particular quantity			Partitions quantities to 10 into 2 or more parts and recognises that this does not affect the total e.g. 6 as 3 and 3/2 and 2 and 2			
Addition and Subtraction	Sorts & classifies objects using quantity as an attribute e.g. sets of 1, 2 within 0-10	Compares 2 sets to decide which has the fewest/most within 0-10	Finds the total when 1,2 or 3 is added to an existing amount e.g. a number line or height chart (augmentation)	Finds the total when 2 sets are added together within 0-10 (aggregation)	Finds out how many are left when 1 or 2 are taken away within 0-10	Compares to find the difference between sets as a quantity within 0-10	Beginning to count on and back in ones to add and subtract with objects or number line within 0-10
Multiplication and Division	Shares out a group of items into 2 equal sets within 0-10. Groups objects into matching or natural sets of 2 e.g. shoes within 0-10			Begin to identify halves and doubles using concrete materials within 0-10			
Fractions, Decimals and %	Identifies wholes and halves in a social context and uses appropriate language e.g. 'I have eaten half of my banana'		Splits a whole into smaller parts and explains that equal parts are the same size		Understands that a whole can be shared equally and unequally		

Benchmarks
End of Level Assessment



On track statements

"No significant gaps"

Benchmarks are the end of Early Level

(Typically end of Primary 1)

Learning, Teaching and Assessment

	Curriculum organisers	Experiences and Outcomes for planning learning, teaching and assessment	Benchmarks to support practitioners' professional judgement of achievement of a level
Number, money and measure	Estimation and rounding	*I am developing a sense of size and amount by observing, exploring, using and communicating with others about things in the world around me.* MNU 0-01a	• *Recognises the number of objects in a group, without counting (subitising) and uses this information to estimate the number of objects in other groups.* • *Checks estimates by counting.* • *Demonstrates skills of estimation in the contexts of number and measure using relevant vocabulary, including less than, longer than, more than and the same.*
	Number and number processes	*I have explored numbers, understanding that they represent quantities, and I can use them to count, create sequences and describe order.* MNU 0-02a *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.* MNU 0-03a	• *Explains that zero means there is none of a particular quantity and is represented by the numeral 0.* • *Recalls the number sequence forwards within the range 0 - 30, from any given number.* • *Recalls the number sequence backwards from 20.* • *Identifies and recognises numbers from 0 to 20.* • *Orders all numbers forwards and backwards within the range 0 - 20.* • *Identifies the number before, the number after and missing numbers in a sequence within 20.* • *Uses one-to-one correspondence to count a given number of objects to 20.* • *Identifies 'how many?' in regular dot patterns, for example, arrays, five frames, ten frames, dice and irregular dot patterns, without having to count (subitising).* • *Groups items recognising that the appearance of the group has no effect on the overall total (conservation of number).* • *Uses ordinal numbers in real life contexts, for example, 'I am third in the line'.* • *Uses the language of before, after and in-between.* • *Counts on and back in ones to add and subtract.* • *Doubles numbers to a total of 10 mentally.* • *When counting objects, understands that the number name of the last object counted is the name given to the total number of objects in the group.*
	Fractions, decimal fractions and percentages	*I can share out a group of items by making smaller groups and can split a whole object into smaller parts.* MNU 0-07a	• *Splits a whole into smaller parts and explains that equal parts are the same size.* • *Uses appropriate vocabulary to describe halves.* • *Shares out a group of items equally into smaller groups.*

Writing Effective LIs

- **I have explored numbers**, understanding that they represent quantities, and **I can use them to count,** create sequences **and describe order** (MNU 0-02a)

- We are learning to count
- We are learning to sequence
- We are learning to describe the order

GCIP Framework

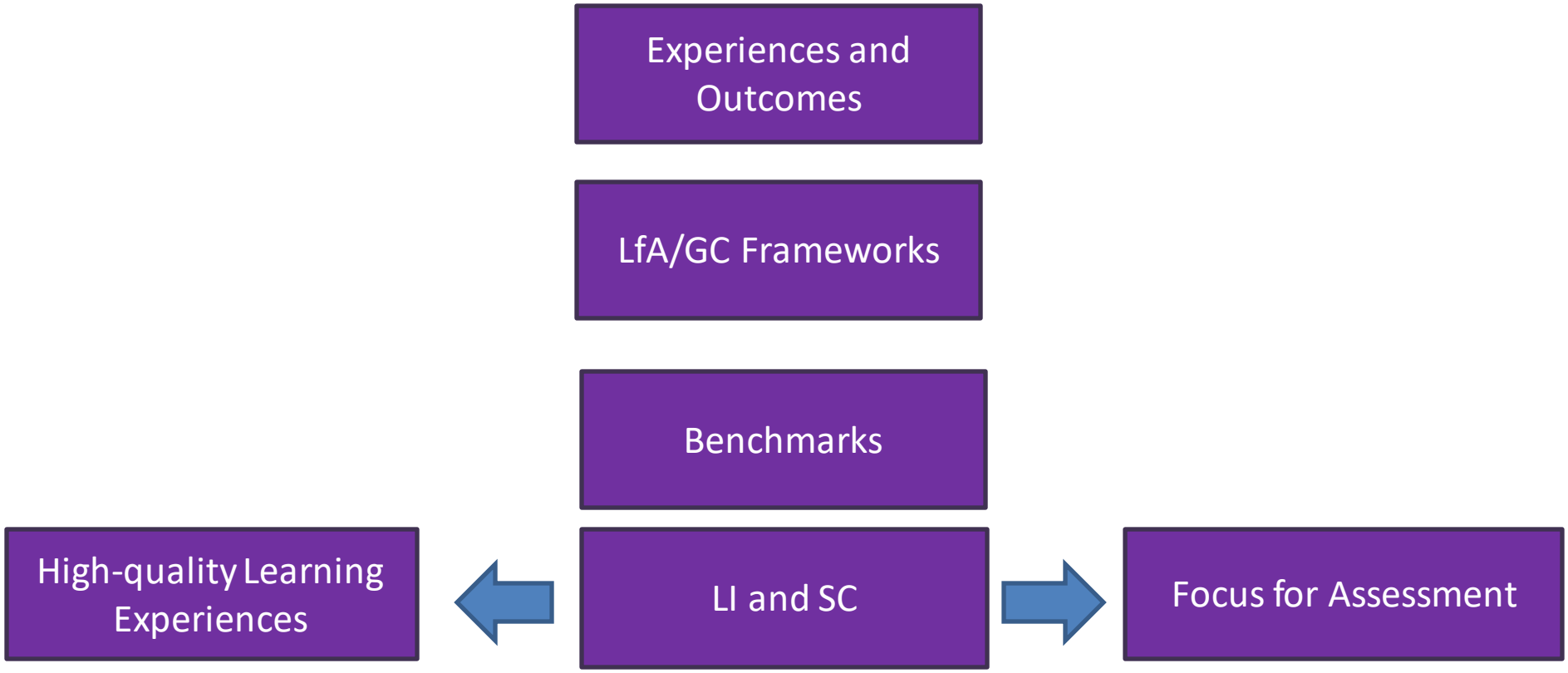
LI: We are learning to count

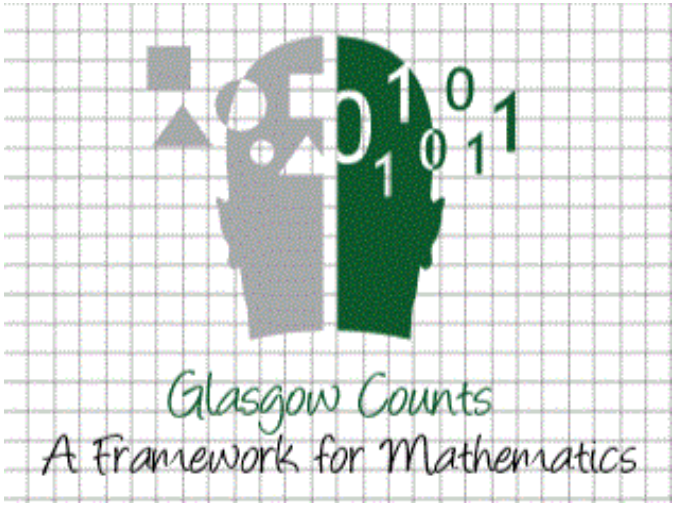
Benchmarks:

- *Recalls* the number sequence forward in the range 0-30, from any given number.
- *Uses one to one correspondence to count a given number of objects to 10*

SC: I can count forwards from 0 - 10
I can count the number of objects in a group
I can point to each object as I count

GCIP Framework





Glasgow Counts
A Framework for Mathematics

Important Information & User Guide for Playrooms

Important Information & User Guide for Primaries

Early Level

Effective Learning and Teaching in Mathematics

Mission Statement:

Our fundamental aim is to fill our young minds with a sense of agency and endow them with the motivation, courage and belief in their power to influence their own futures. We are driven by a commitment to create pathways to enable all stakeholders to possess skills for life, learning and work.

We want our young people to engage with mathematics and build their comprehension of the subject across the curriculum. Society requires young people who are sophisticated mathematical thinkers, pattern spotters and problem solvers therefore we aim to empower our young people as mathematicians.

With this pathway, we aim to provide opportunities for learning that promote deep engagement with all areas of mathematics.

Our purpose is to offer a better way to build mathematical understanding in and beyond our playrooms.

Glasgow Counts

Next slide

Early Years – Key Messages

Young children are born ready and eager for **mathematical thinking**. Research shows that young babies are able to subitise and can compare quantity. Noticing same and different, shapes children's early mathematical thinking, particularly in relation to the child's immediate world and experiences. The child might notice he only has one jelly baby whilst you have two and therefore understanding quantity becomes very important to the child! By observing similarities and differences and making comparisons the young child starts to become mathematically aware. With the help of an interested and **attuned adult** this can happen quite naturally through play and playful approaches, as the adult and child draw each others' attention to what is important, and talk about what they can see and think. Through talk the adult provides the child with the **language and mathematical terms** they need to describe what they are observing and experiencing. Children should be engaged in mathematical **experiences** everyday, in an **environment** which has a rich affordance for all elements of the curriculum. **Interactions** and the role of the adult is key as the child is building an association with mathematics as playful, creative and joyous. Children need adults who are curious, joyful and confident who can foster and scaffold positive experiences **with other learners**. The adult in early years is also fostering the child's **learning dispositions**. Therefore the Glasgow Counts framework should be considered alongside Development Matters (see p.6 and p.7). It is important also to consider how families are able to support their child's learning in mathematics, ensuring the key messages and playful ideas are shared with **families**, will give young children the best chance of success and of acquiring a **life-long love** of mathematical learning.

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Glasgow Counts – Framework

These lines of progression for mathematics has been developed to support practitioners in their delivery of the mathematics curriculum.

The framework captures all elements of mathematics and breaks down each concept into a series of progressive Learning Intentions, informed by Education Scotland's Benchmarks.

The trackers allow practitioners to monitor learner's progress across levels, supporting transition between stages. The strategies and approaches pages, will support practitioners through Glasgow Counts core training.

The Glasgow Counts key messages are:

- to use the CPA approach to develop conceptual understanding
- to develop problem solving, reasoning and fluency
- to create mathematical mindsets
- to engage in Maths Talk
- to meet the needs of all learners' needs
- to develop mastery learning

We would like to acknowledge the original draft Glasgow Counts Numeracy Framework (2017) and also Mathematics: Lines of Progression written by Glasgow City Council, North Lanarkshire Council and Inverclyde Council completed in 2014.
Inspiration and guidance has also been taken from NCETM, NRich and Kangaroo Maths.

Next slide

Glasgow Counts - Framework

Please note that guidance on the strategies & approaches pages and the resources pages are not exclusive. We urge practitioners to seek out and develop learning experiences which will best support the learners in their own playrooms.

Each topic has a resources page. We would like schools to take ownership of these pages and insert their own lesson plans, printables, links to maths resources, etc.

It is essential that practitioners make themselves familiar with the framework, and there will be the opportunity to attend twilight information sessions.

This document does not show a linear progression and **practitioners must ensure they make explicit links across areas of learning. The following pages will give a step by step overview.**

These pathways are a working document and will be updated regularly. Please be flexible in your approach and keep up-to-date with developments to ensure you can best plan for excellent learning and teaching.

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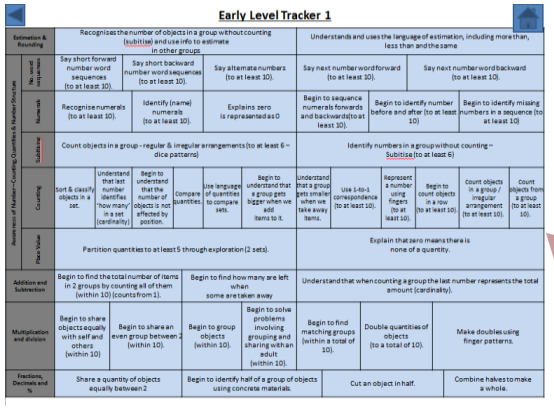
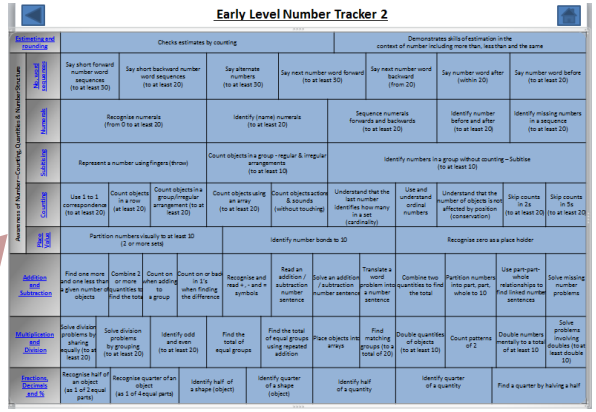
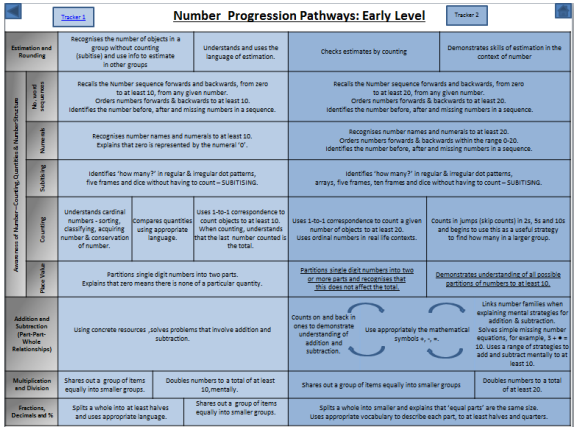
Glasgow Counts – Guidance for use of Tracker

The framework for Mathematics has been organised into the Curriculum Organisers in line with the CfE Experiences and Outcomes. Progression in Numeracy relies on learners developing an understanding of the intrinsic links across each of these organisers. As such, it is essential that progression within each organiser is not achieved in isolation of the others. Planning should therefore focus on developing progressive learning experiences that draw from each of the organisers.





The trackers developed for each level provide a detailed breakdown of the progressive learning intentions embedded within the framework. They aim to support practitioners to track coverage through the framework and can be used in conjunction with individual establishments' planning procedures.



The trackers can be navigated to via the overview page at each level and are broken down into 2 at Early Level, 3 at First Level and 3 at Second Level.

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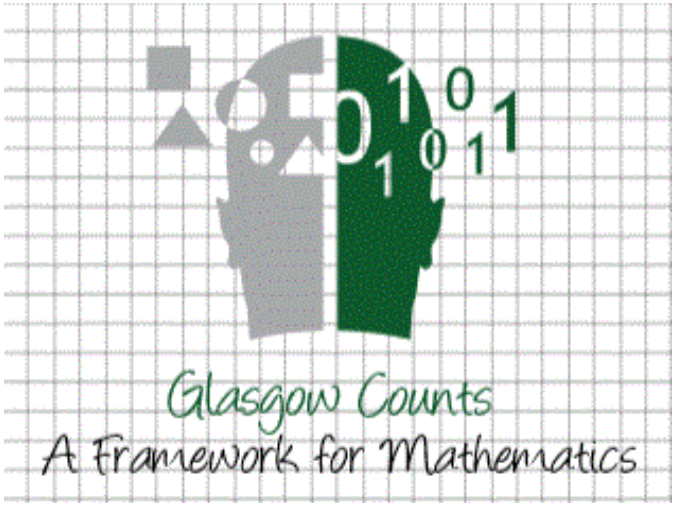

Glasgow Counts
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Early Level

GCIP Framework

Glasgow Counts
Numeracy & Mathematics Framework
Early Level

Number, Money & Measure

Shape, Position & Movement

Information Handling

Number Overview & Resources

Overview & Resources

Overview & Resources

Money & Measure Overview & Resources

Click on interactive buttons for details of experiences and outcomes, trackers and resources.

Family Learning Fun

Glasgow Counts Numeracy and Maths Planner

	Organiser	Early Level Experiences and Outcomes
Number, Money and Measure	Estimation & Rounding	*I am developing a sense of size and amount by observing, exploring, using and communicating with others about things in the world around me.* ***MNU 0-01a***
	Number & Number Processes	*I have explored numbers, understanding that they represent quantities, and I can use them to count, create sequences and describe order.* ***MNU 0-02a*** *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.* ***MNU 0-03a***
	Fractions, Decimals & %	*I can share out a group of items by making smaller groups and can split a whole object into smaller parts.* ***MNU 0-07a***
	Money	*I am developing my awareness of how money is used and can recognise and use a range of coins.* ***MNU 0-09a***
	Time	*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.* ***MNU 0-10a***
	Measure	*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.* ***MNU 0-11a***
	Patterns and Relationships	I have spotted and explored patterns in my own and the wider environment and can copy and continue these and create my own patterns. **MTH 0-13a**

Glasgow Counts Numeracy and Maths Planner

	Organiser	Early Level Experiences and Outcomes
Shape, Position & Movement	Properties of 2D shapes & 3D objects	*I enjoy investigating objects and shapes and can sort, describe and be creative with them.* ***MTH 0-16a***
	Angle, Symmetry & Transformation	*In movement, games, and using technology I can use simple directions and describe positions.* ***MTH 0-17a*** *I have had fun creating a range of symmetrical pictures and patterns using a range of media.* ***MTH 0-19a***

Glasgow Counts Numeracy and Maths Planner

	Organiser	Early Level Experiences and Outcomes
Information Handling	Data & Analysis	*I can collect objects and ask questions to gather information, organising and displaying my findings in different ways.* *MNU 0-20a* *I can match objects, and sort using my own and others' criteria, sharing my ideas with others.* *MNU 0-20b* *I can use the signs and charts around me for information, helping me plan and make choices and decisions in my daily life.* *MNU 0-20c*
	Ideas of chance and uncertainty	*There are no Experiences and Outcomes at early level.*

GCIP Framework

Glasgow Counts
Numeracy & Mathematics Framework
Early Level

Number, Money & Measure

Number Overview & Resources

Money & Measure Overview & Resources

Shape, Position & Movement

Overview & Resources

Information Handling

Overview & Resources

Click on interactive buttons for details of experiences and outcomes, trackers and resources.

Family Learning Fun

Tracker 1

Number Progression Pathways: Early Level

Tracker 2

Estimation and Rounding		Knows they can check estimates by counting within 0-10 Can apply subitising skills to estimate the number of items in a set	Uses the language of estimation, including more than, less than, fewer than and the same		Checks estimates by counting	Demonstrates skills of estimation in the context of number
Awareness of Number – Counting, Quantities & Number Structure	**No. word sequences**	Say short forward and backward number word sequences within 0-10	Uses ordinal numbers in real life contexts e.g. I am first/second/ third in the line'	Recalls the number sequence forwards and backwards within 0-10	Recalls the Number sequence forwards and backwards, from zero to at least 20, from any given number. Orders numbers forwards & backwards to at least 20. Identifies the number before, after and missing numbers in a sequence.	
	Numerals	Recognises and identifies numerals within 0-10 Explains that zero is represented by the numeral '0' Orders numerals forwards and backwards within 0-10 Identifies number before, after and missing numbers in a sequence within 0-10; beginning to use the language before, after and in-between			Recognises number names and numerals to at least 20. Orders numbers forwards & backwards within the range 0-20. Identifies the number before, after and missing numbers in a sequence.	
	Subitising	Identifies and represents regular and irregular dot patterns in different arrangements e.g.dot arrangement/on fingers/five frames/ 10 frames/dice without counting up to 6			Identifies 'how many?' in regular & irregular dot patterns, arrays, five frames, ten frames and dice without having to count – SUBITISING.	
	Counting	Uses the 5 principles of counting to count objects within 0-10 Counts objects in a set recognising that the appearance of the objects has no effect on the overall total within 0-10 (conservation)			Uses 1-to-1 correspondence to count a given number of objects to at least 20. Uses ordinal numbers in real life contexts.	Counts in jumps (skip counts) in 2s, 5s and 10s and begins to use this as a useful strategy to find how many in a larger group.
	Place Value	Explains that zero means there is none of a particular quantity Partitions quantities to 10 into 2 or more parts and recognises that this does not affect the total e.g. 6 as 3 and 3/2 and 2 and 2			<u>Partitions single digit numbers into two or more parts and recognises that this does not affect the total.</u>	<u>Demonstrates understanding of all possible partitions of numbers to at least 10.</u>
Addition and Subtraction		Compares 2 sets to decide which has the fewest/most within 0-10 Sorts, classifies partitions, orders and compares sets that have the same and differing quantities Beginning to count on and back in ones to add and subtract with objects or number line within 0-10			Counts on and back in ones to demonstrate understanding of addition and subtraction. Use appropriately the mathematical symbols +, -, =.	Links number families when explaining mental strategies for addition & subtraction. Solves simple missing number equations, for example, 3 + ● = 10. Uses a range of strategies to add and subtract mentally to at least 10.
Multiplication and Division		Shares out a group of items into 2 equal sets within 0-10 Groups objects into matching or natural sets of 2 e.g. shoes within 0-10 Begin to identify halves and doubles using concrete materials within 0-10			Shares out a group of items equally into smaller groups	Doubles numbers to a total of at least 20.
Fractions, Decimals and %		Identifies wholes and halves in a social context and uses appropriate language e.g. 'I have eaten half of my banana'	Splits a whole into smaller parts and explains that equal parts are the same size Understands that a whole can be shared equally and unequally		Splits a whole into smaller and explains that 'equal parts' are the same size. Uses appropriate vocabulary to describe each part, to at least halves and quarters.	

Tracker 1

Money & Measure Progression Pathways: Early Level

Tracker 2

Money		Handles money and recognises a few coins up to the value of £2 through play and in real life and relevant contexts (using real and plastic money) Identifies (names) 1p, 2p, 5p and 10p coins and pays the exact value for items to 10p e.g. if the price is 5p; can use a 5p coin to pay for it	Apply addition and subtraction skills to money contexts.	Use 1p, 2p,5p and 10p coins to pay the exact value for items to 10p.	
Time		Links daily routines and personal events to time sequences and begins to use appropriate language including before, after, later, earlier Recognises and where appropriate engages with everyday devices used to measure or display time e.g. clocks, calendars, sand timers and visual timetables Identifies (names) the days of the week in sequence Recognises the months of the year and describes features of the four seasons in relevant contexts	Recognise, talk about and , where appropriate, engage with everyday devices used to measure or display time- including sand timers, clocks, calendars and visual timetables.	Use appropriate language when discussing time, including before, after, o'clock, hour hand and minute hand.	Read analogue and digital o'clock times (12 hour only) and represent this to a digital display or clock face.
Measurement	Length	Shares relevant experiences in which measurements of lengths, heights, mass and capacities are used, for example, in baking and other meaningful contexts Describes and compares common objects' lengths, heights, mass and capacities using everyday language, including long/longer, short/shorter, tall/taller, heavy/heavier, light/lighter, more/less/same Estimates, then measures, the length, height, mass and capacity of common objects using a range of appropriate non-standard units	Compare and describe lengths, heights, mass and capacities using everyday language , including longer, shorter, taller, heavier, lighter, more and less.	Estimate then measure the length, height, mass and capacity of familiar objects using a range of appropriate non-standard units.	
	Mass				
	Capacity				
Patterns and Relationships		Copies, continues and creates simple patterns Involving objects shapes and numbers.	Copies, continues and creates simple patterns involving objects, shapes and numbers. Find missing numbers on a number line within the range 0-20.		

Tracker 1

Shape, Position & Movement Progression Pathways: Early Level

Tracker 2

2D shapes and 3D Objects	Recognise and describe common 2D shapes and 3D objects by attribute e.g. straight, round, flat and curved Sort common 2D shapes and 3D objects according to attribute e.g. shape, colour, size	Recognise, describe and sort common 2D and 3D objects according to various criteria, for example, straight, round, flat and curved.	
Angles, Symmetry and Transformation	Correctly uses some of the language of position e.g. in front, behind, above, below Begins to correctly use some of the language of direction e.g. left right, forwards and backwards to solve simple problems in relevant contexts Identifies and describes basic symmetrical pictures with one line of symmetry Creates basic symmetrical pictures with one line of symmetry	Understand and correctly use the language of position and direction, Including in front, behind, above, below, left, right, forwards and backwards to solve simple problems in movement games.	Identify, describe and create symmetrical pictures with one line of symmetry.

Tracker 1

Information Handling Progression Pathways: Early Level

Tracker 2

Ideas of Chance & Uncertainty	No experiences at this level	No experiences at this level		
Data Handling and Analysis	Uses knowledge of colour, shape, size and other properties to match and sort items in a variety of different ways Collects and organises objects for a specific purpose Asks simple questions to collect data for a specific purpose Contributes to a concrete or pictorial display where one object or drawing represents on data value, using digital technologies as appropriate With support interprets simple graphs, charts and signs and demonstrates how they support planning, choices and decision making With support applies counting skills to ask an answer questions and makes relevant choices and decisions based on the data	Apply counting skills to ask and answer different questions and make relevant choices and decisions based on the data.	Contribute to concrete or pictorial displays where one object or drawing represents one data value, using digital technologies as appropriate.	Interpret simple graphs, charts and signs and demonstrate how they support planning, choices and decision making.
Impact on the World	There are no experiences and outcomes at early level.	There are no experiences and outcomes at early level.		

Tracker 1

Number Progression Pathways: Early Level

Tracker 2

Estimation and Rounding		Knows they can check estimates by counting within 0-10 Can apply subitising skills to estimate the number of items in a set		Uses the language of estimation, including more than, less than, fewer than and the same	Checks estimates by counting	Demonstrates skills of estimation in the context of number
Awareness of Number – Counting, Quantities & Number Structure	**No. word sequences**	Say short forward and backward number word sequences within 0-10	Uses ordinal numbers in real life contexts e.g. I am first/second/ third in the line'	Recalls the number sequence forwards and backwards within 0-10	Recalls the Number sequence forwards and backwards, from zero to at least 20, from any given number. Orders numbers forwards & backwards to at least 20. Identifies the number before, after and missing numbers in a sequence.	
	Numerals	Recognises and identifies numerals within 0-10 Explains that zero is represented by the numeral '0' Orders numerals forwards and backwards within 0-10 Identifies number before, after and missing numbers in a sequence within 0-10; beginning to use the language before, after and in-between			Recognises number names and numerals to at least 20. Orders numbers forwards & backwards within the range 0-20. Identifies the number before, after and missing numbers in a sequence.	
	Subitising	Identifies and represents regular and irregular dot patterns in different arrangements e.g.dot arrangement/on fingers/five frames/ 10 frames/dice without counting up to 6			Identifies 'how many?' in regular & irregular dot patterns, arrays, five frames, ten frames and dice without having to count – SUBITISING.	
	Counting	Uses the 5 principles of counting to count objects within 0-10 Counts objects in a set recognising that the appearance of the objects has no effect on the overall total within 0-10 (conservation)			Uses 1-to-1 correspondence to count a given number of objects to at least 20. Uses ordinal numbers in real life contexts.	Counts in jumps (skip counts) in 2s, 5s and 10s and begins to use this as a useful strategy to find how many in a larger group.
	Place Value	Explains that zero means there is none of a particular quantity Partitions quantities to 10 into 2 or more parts and recognises that this does not affect the total e.g. 6 as 3 and 3/2 and 2 and 2			<u>Partitions single digit numbers into two or more parts and recognises that this does not affect the total.</u>	<u>Demonstrates understanding of all possible partitions of numbers to at least 10.</u>
Addition and Subtraction		Compares 2 sets to decide which has the fewest/most within 0-10 Sorts, classifies partitions, orders and compares sets that have the same and differing quantities Beginning to count on and back in ones to add and subtract with objects or number line within 0-10			Counts on and back in ones to demonstrate understanding of addition and subtraction. Use appropriately the mathematical symbols +, -, =.	Links number families when explaining mental strategies for addition & subtraction. Solves simple missing number equations, for example, 3 + ● = 10. Uses a range of strategies to add and subtract mentally to at least 10.
Multiplication and Division		Shares out a group of items into 2 equal sets within 0-10 Groups objects into matching or natural sets of 2 e.g. shoes within 0-10 Begin to identify halves and doubles using concrete materials within 0-10			Shares out a group of items equally into smaller groups	Doubles numbers to a total of at least 20.
Fractions, Decimals and %		Identifies wholes and halves in a social context and uses appropriate language e.g. 'I have eaten half of my banana'	Splits a whole into smaller parts and explains that equal parts are the same size Understands that a whole can be shared equally and unequally		Splits a whole into smaller and explains that 'equal parts' are the same size. Uses appropriate vocabulary to describe each part, to at least halves and quarters.	

Early Level Tracker 1

Estimation & Rounding	Knows they can check estimates by counting within 0-10		Can apply subitising skills to estimate the number of items in a set		Uses the language of estimation, including more than, less than, fewer than and the same			
Awareness of Number – Counting, Quantities & Number Structure: No. word sequences	Say short forward and backward number word sequences within 0-10		Uses ordinal numbers in real life contexts e.g. I am first/second/third in the line'		Recalls the number sequence forwards and backwards within 0-10			
Numerals	Recognise numerals e.g. points to the number from 0-10	Identify (name) numerals e.g. can respond to question 'what is that number?' from 0-10	Explains zero is represented as 0	Orders numerals forwards and backwards within 0-10	Identifies number before, after and missing numbers in a sequence within 0-10; beginning to use the language before, after and in-between			
Subitising	Identifies 'how many?' in regular dot patterns e.g. dot arrangement/on fingers/five frames/10 frames/dice without counting up to 6		Identifies 'how many?' in irregular dot patterns e.g. dot arrangement/on fingers/five frames/10 frames/dice without counting up to 6		Represents amounts in different arrangements e.g.dot arrangement/on fingers/five frames/ 10 frames/dice without counting up to 6			
Counting	When counting objects understands the order in which we say the numbers is always the same (stable order)	Touch counts one item when each number word is said (1-to-1 correspondence)	When counting objects understands that the number name of the last object counted is the name given to the total number of objects in a set (cardinal principle)	When counting objects understands that the number of objects is not affected by position (order irrelevance)	Counts objects in a set recognising that the appearance of the objects has no effect on the overall total within 0-10 (conservation)	Counts anything e.g. objects at a distance/in a book/sounds/claps within 0-10 (abstract principle)		
Place Value	Explains that zero means there is none of a particular quantity			Partitions quantities to 10 into 2 or more parts and recognises that this does not affect the total e.g. 6 as 3 and 3/2 and 2 and 2				
Addition and Subtraction	Sorts & classifies objects using quantity as an attribute e.g. sets of 1, 2 within 0-10	Compares 2 sets to decide which has the fewest/most within 0-10	Finds the total when 1,2 or 3 is added to an existing amount e.g. a number line or height chart (augmentation)	Finds the total when 2 sets are added together within 0-10 (aggregation)	Finds out how many are left when 1 or 2 are taken away within 0-10	Compares to find the difference between sets as a quantity within 0-10	Beginning to count on and back in ones to add and subtract with objects or number line within 0-10	
Multiplication and Division	Shares out a group of items into 2 equal sets within 0-10. Groups objects into matching or natural sets of 2 e.g. shoes within 0-10			Begin to identify halves and doubles using concrete materials within 0-10				
Fractions, Decimals and %	Identifies wholes and halves in a social context and uses appropriate language e.g. 'I have eaten half of my banana'		Splits a whole into smaller parts and explains that equal parts are the same size		Understands that a whole can be shared equally and unequally			

Money & Measure: Early Level Tracker 1

Money		Handles money and recognises a few coins up to the value of £2 through play and in real life and relevant contexts (using real and plastic money)		Identifies (names) 1p, 2p, 5p and 10p coins and pays the exact value for items to 10p e.g. if the price is 5p; can use a 5p coin to pay for it	
Time		Links daily routines and personal events to time sequences and begins to use appropriate language including before, after, later, earlier	Recognises and where appropriate engages with everyday devices used to measure or display time e.g. clocks, calendars, sand timers and visual timetables	Identifies (names) the days of the week in sequence	Recognises the months of the year and describes features of the four seasons in relevant contexts
Measurement	**Length**	Shares relevant experiences in which measurements of lengths, heights , mass and capacities are used, for example, in baking and other meaningful contexts	Describes and compares common objects' lengths, heights, mass and capacities using everyday language, including long/longer, short/shorter, tall/taller, heavy/heavier, light/lighter, more/less/same	Estimates, then measures, the length, height, mass and capacity of common objects using a range of appropriate non-standard units	
	Mass				
	Capacity				
Patterns & Relationships		Copies simple patterns involving objects , shapes and numbers	Continues simple patterns involving objects , shapes and numbers	Creates simple patterns involving objects , shapes and numbers	

Shape, Position and Movement: EL1

Shape	Recognise and describe common 2D shapes and 3D objects by attribute e.g. straight, round, flat and curved		Sort common 2D shapes and 3D objects according to attribute e.g. shape, colour, size	
Angles, Symmetry and Transformation	Correctly uses some of the language of position e.g. in front, behind, above, below	Begins to correctly use some of the language of direction e.g. left right, forwards and backwards to solve simple problems in relevant contexts	Identifies and describes basic symmetrical pictures with one line of symmetry	Creates basic symmetrical pictures with one line of symmetry

Information Handling: EL1

Data Handling and Analysis	Uses knowledge of colour, shape, size and other properties to match and sort items in a variety of different ways	Collects and organises objects for a specific purpose	Asks simple questions to collect data for a specific purpose	Contributes to a concrete or pictorial display where one object or drawing represents on data value, using digital technologies as appropriate	With support interprets simple graphs, charts and signs and demonstrates how they support planning, choices and decision making	With support applies counting skills to ask and answer questions and makes relevant choices and decisions based on the data

Early Level Tracker 1

Estimation & Rounding	Knows they can check estimates by counting within 0-10		Can apply subitising skills to estimate the number of items in a set		Uses the language of estimation, including more than, less than, fewer than and the same			
Awareness of Number – Counting, Quantities & Number Structure: No. word sequences	Say short forward and backward number word sequences within 0-10		Uses ordinal numbers in real life contexts e.g. I am first/second/third in the line'		Recalls the number sequence forwards and backwards within 0-10			
Numerals	Recognise numerals e.g. points to the number from 0-10	Identify (name) numerals e.g. can respond to question 'what is that number?' from 0-10	Explains zero is represented as 0	Orders numerals forwards and backwards within 0-10	Identifies number before, after and missing numbers in a sequence within 0-10; beginning to use the language before, after and in-between			
Subitising	Identifies 'how many?' in regular dot patterns e.g. dot arrangement/on fingers/five frames/10 frames/dice without counting up to 6		Identifies 'how many?' in irregular dot patterns e.g. dot arrangement/on fingers/five frames/10 frames/dice without counting up to 6		Represents amounts in different arrangements e.g. dot arrangement/on fingers/five frames/ 10 frames/dice without counting up to 6			
Counting	When counting objects understands the order in which we say the numbers is always the same (stable order)	Touch counts one item when each number word is said (1-to-1 correspondence)	When counting objects understands that the number name of the last object counted is the name given to the total number of objects in a set (cardinal principle)	When counting objects understands that the number of objects is not affected by position (order irrelevance)	Counts objects in a set recognising that the appearance of the objects has no effect on the overall total within 0-10 (conservation)	Counts anything e.g. objects at a distance/in a book/sounds/claps within 0-10 (abstract principle)		
Place Value	Explains that zero means there is none of a particular quantity			Partitions quantities to 10 into 2 or more parts and recognises that this does not affect the total e.g. 6 as 3 and 3/2 and 2 and 2				
Addition and Subtraction	Sorts & classifies objects using quantity as an attribute e.g. sets of 1, 2 within 0-10	Compares 2 sets to decide which has the fewest/most within 0-10	Finds the total when 1,2 or 3 is added to an existing amount e.g. a number line or height chart (augmentation)	Finds the total when 2 sets are added together within 0-10 (aggregation)	Finds out how many are left when 1 or 2 are taken away within 0-10	Compares to find the difference between sets as a quantity within 0-10	Beginning to count on and back in ones to add and subtract with objects or number line within 0-10	
Multiplication and division	Shares out a group of items into 2 equal sets within 0-10. Groups objects into matching or natural sets of 2 e.g. shoes within 0-10			Begin to identify halves and doubles using concrete materials within 0-10				
Fractions, Decimals and %	Identifies wholes and halves in a social context and uses appropriate language e.g. 'I have eaten half of my banana'		Splits a whole into smaller parts and explains that equal parts are the same size		Understands that a whole can be shared equally and unequally			

Addition and Subtraction: Early Level

Mathematical Language : add, more, make, altogether, total, how many more? How many left?, find the difference, take away, subtract, leave, count on, count back, number sentence, plus, sum, left over, is the same as, equal to.

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MNU0-03a

Strategies and Approaches

Once children have mastered the cardinal principle and know the last item counted gives the amount in any set, they can begin engage in ordering sets showing an understanding that 1,2,3 or 3,2,1 means an increase or decrease in quantity. They can begin to engage in early addition and subtraction as a concrete activity by exploring:

Early Addition

- ways a set can be broken into smaller sets e.g. 6 can be 4 and 2 - **partitioning**
- adding to an existing amount to find a new total – **augmentation**
- combining two sets together to find a new total – **aggregation**

Early Subtraction

- two sets to think about which has most/fewest - **comparison**
- two sets to think about which has more items a
- taking away items from a set and find a new to

Click on links for examples of different teaching strategies

Small World: children may be working with farm an in the field or leave the field so this gives the possibility of working out a new total. Children might work out how many animals are on the farm altogether by aggregating 2 or more sets together

Board games: games that involve building up a set of items lend themselves to discussion about how many is their set, how many they have now, who has most/fewest.

Outdoors: children might add to existing sets of conkers, twigs, leaves. They may compare their sets with a friend to work out who has fewest and by how many. They might be building and decide they need more or fewer bricks. They can compare against their own prediction. They might be monitoring the bird feeder for different types of bird and compare the amounts of each type within the day and over time. They might start to think about this in terms of why certain birds come is it certain food that they like? **Children have to see early number processes as purposeful and meaningful for them.**

Questions to Enable Higher Order Thinking Skills

- What would happen if 2 more cows came into the field? How many would there be?
- How many grapes do you have on your plate? How many will you have when you eat one?
- Who has the fewest grapes left on their plate?
- Can you show me different ways to make 6 with your fingers? What if you added one more finger – how many would you have then?
- The birds have all left the bird feeder – how many are there now? How many starlings do you think will come tomorrow?
- Which is the most popular fruit for snack? How many more like apples than grapes?
- away 2 cartons of milk how many will we have? Will we ough for everyone?
- people in these 2 cars got on the bus, how many people e on the bus?
- How many different ways can you show me 6 using these items in the circles?

Barriers to Learning and Misconceptions

- Not fully confident in number recognition and counting.
- Children will require modelling to build their organizational skills e.g. working in rows, combining sets carefully
- Unclear language e.g. a ~~few~~ more, ~~a lot~~ less
- Children may be asked to state 'the most' very frequently; they need to also be asked about 'the fewest' to build understanding.
- Children need to have meaningful ways to work with sets or they will not have a motivation to work things out.

On Track at Transition Statement

- Beginning to compare and find the diffe between sets quantity within 0-10
- Beginning to count on and back in ones objects or number line within 0-10

Digital Learning:

more lesson resources here…

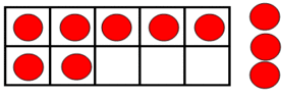
Resources

Next slide

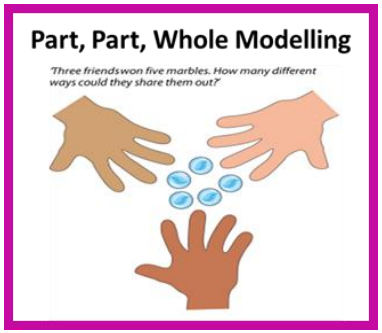
Resources – Addition and Subtraction

Common Learning Resources

Five and Ten Frames



Part, Part, Whole Modelling

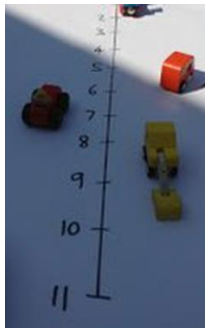


Sets to bring together

Sets of manmade and natural objects to add to and take away from

Board games

Height charts and number lines



Online Resources

Stories

- *The Country Bunny and the Little Gold Shoes* by Rick Walton
- *The Crayon Counting Book* by Pam Munoz Ryan and Jerry Pallotta
- *Fat Frogs On a Skinny Log* by Sara Riches
- *The Icky Bug Counting Book* by Jerry Pallotta
- *Ten Terrible Dinosaurs* by Paul Stickland
- *Ten Sly Piranhas* by William Wise
- *Five Little Ducks* by Pam Paparone
- *Construction Countdown* by K.C. Olsen
- *The Very Hungry Caterpillar* by Eric Carle
- *Five little monkeys go shopping* by Eileen Christelow
- *Ten Little Beasties* by Rebecca Emberley
- *Wibbly Pig has 10 balloons* by Mick Inkpen
- *One less fish* by Kim Michelle Toft
- *Magic Numbers* by Patrick George

Early Addition

Aggregation - Bringing 2 sets together

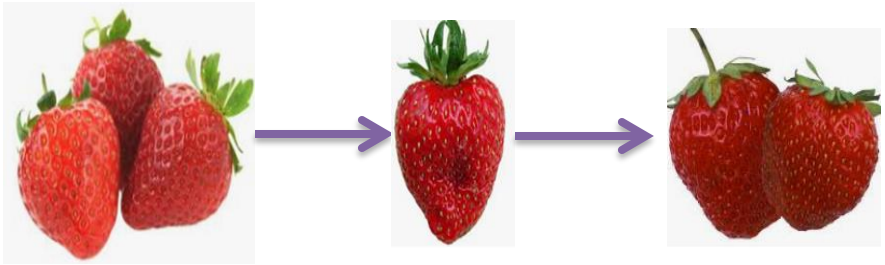
Augmentation – Adding more to an existing amount

You have increased from number 5 to number 7 on the height chart.

Early Subtraction

Finding the difference

Reduction - Take away



Subitising: Early Level

Language How many, dots, patterns, objects, dice, domino, five frame, ten frame, array, tell me what you see

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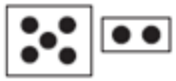
Strategies and Approaches

Subitising is an essential part of developing number sense. By looking at a group of items, children can start to develop an understanding of how a number is made up (https://valeriefaulknermathclub.files.wordpress.com/2017/05/faulkner_ainslie_proof.pdf)

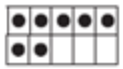
Perceptual Subitising *is the amount you can instantly recognise without counting. We do this 'naturally' from a young age. It becomes difficult to process the 'full amount' beyond 5 or 6. Beyond 6 you will apply conceptual subitising skills to chunk what you see into smaller values.*

Conceptual Subitising *chunks a larger amount into smaller values. Beyond 6 your mind will process a larger amount e.g. 7 as 5 and 2 or 3 and 4 depending on the representation. This is made possible if the amounts are arranged in an organised way. Therefore effective conceptual subitisers need to be taught to organise their amounts into regular patterns, and 5/10 frames, to make subitising possible. Irregular arrangements are far harder to see and should only be used within 5. Beyond 5 or 6 children will need to adopt regular arrangements to see the amount.*

irregular arrangements



regular arrangement



10 frame

- **Fingers:** Use fingers everyday to represent quantities. What do you see? How do you know? Can you grow the number adding a finger at a time? Challenge children e.g. make 5 using 2 hands in different ways.
- **Dot arrangements:** Look for everyday opportunities for learners to see and organise regular structured representations of numbers e.g. objects or dots organised on a five frame or a ten frame, Numicon, dominos , playing cards, an abacus and dice: dice/dominoes/five/ten frames/counters Children should be familiar with all of these ways of seeing patterns of numbers for example by:
  - Playing board games, dominos , cards games and snap games
  - Registering attendance on a five or ten frame/ voting for preferences on the five or ten frame
  - Recording who has had snack on a ten frame, ordering at the 'bakery' on a five or ten frames
- Ordering regular and irregular patterns, on a subitising washing line for example, will give learners the opportunity to show they understand the dot patterns represent increasing amounts.

Digital Learning

Resources

Questions to Enable Higher Order Thinking

- Can you show me your age using your fingers?
- Can you show me 4 using finger patterns? Can you make it in a different way
- How many on each hand?
- How many circles did you see in the picture?
- Can you tell me without counting?
- What other groups of circles did you see?
- Tell me what you see

Barriers to Learning and Misconceptions

- The spatial arrangement of sets influences how difficult they are to subitise. Children usually find rectangular arrangements easiest, followed by linear, circular, and scrambled arrangements
- If children have poor skill development with number word sequences – ability to say numbers in the correct order, they will find subitising difficult
- Inability to identify and match objects seen with associated number name
- Inability to count on – when subitising more than one group

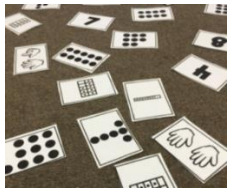
On Track at Transition Statement

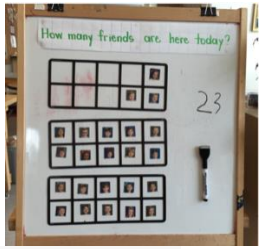
- Represents amounts in different arrangements e.g.dot arrangement/on fingers/five frames/ 10 frames/dice without counting up to 6

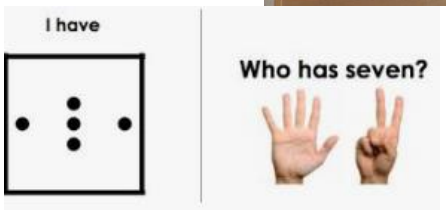
Resources – Subitising

Common Learning Resources

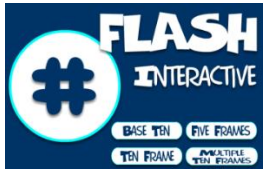
- Sets of counters and objects placed in different arrangements
- Dice
- Dominos
- Subitising cards
- Subitising stones
- Rekenrek
- Children's fingers
- Playing cards







Online Resources



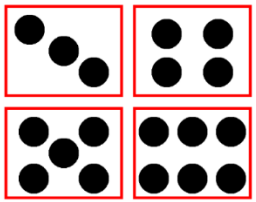
Hidden Jewels
Age 3 to 5

Saying how many there are without counting

Stories

- *Ten Black Dots* by Donald Crews
- *The Very Hungry Caterpillar* by Eric Carle
- *Night Light* by Nicholas Blechman
- *Dog's Colourful Day* by Emma Dodd
- *My Very First Book of Numbers* by Eric Carle
- *Ten Little Rubber Ducks* by Eric Carle
- *How Many Snails?:* A Counting Book

Dominos, dice and playing cards



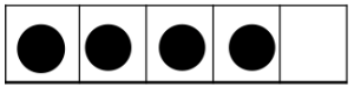
I see four

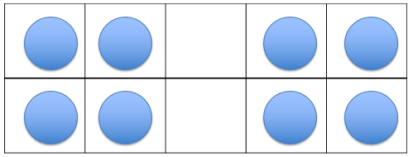
What else do you see?

Irregular pattern cards and games

An open frame where children can create their own patterns

Using a five/ten frame create structured patterns





How many altogether?

How many children are here today?

How many different ways to make 8?

Noticing patterns in nature/real world

Glasgow Counts – Guidance for use of Tracker in Early Years

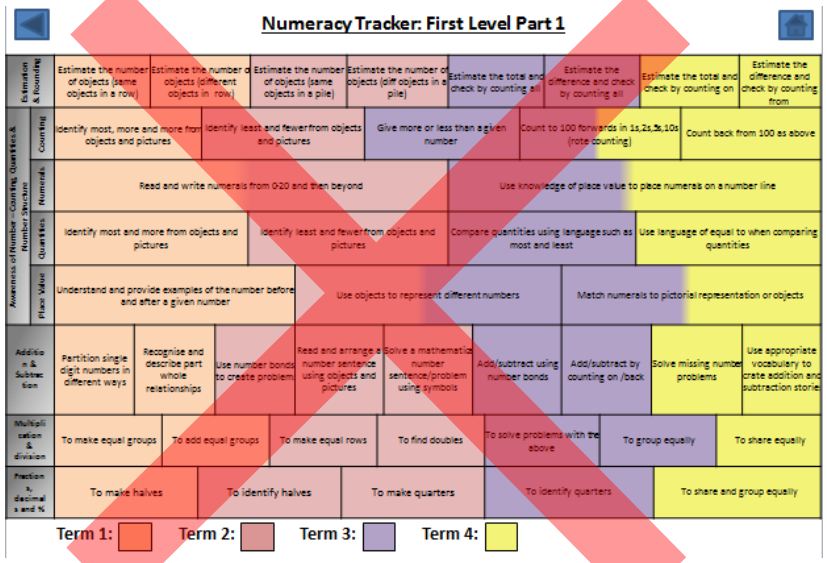


Figure 1

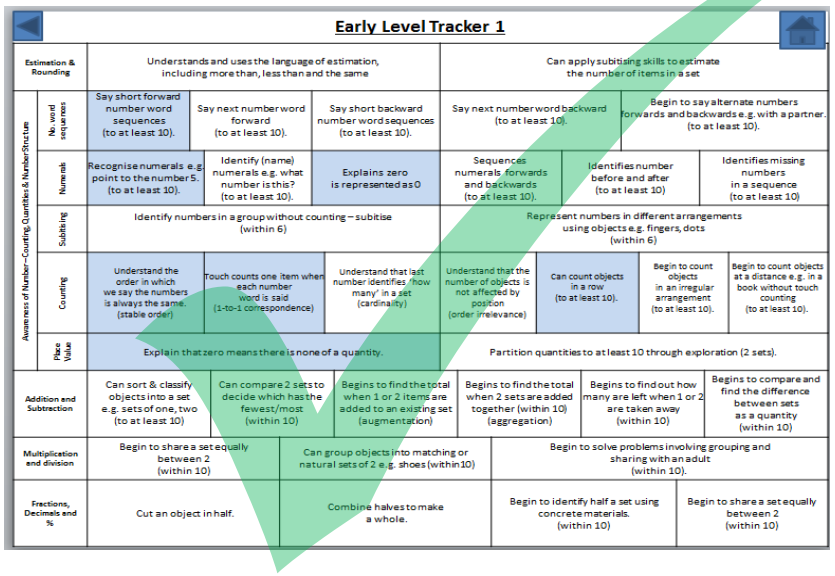
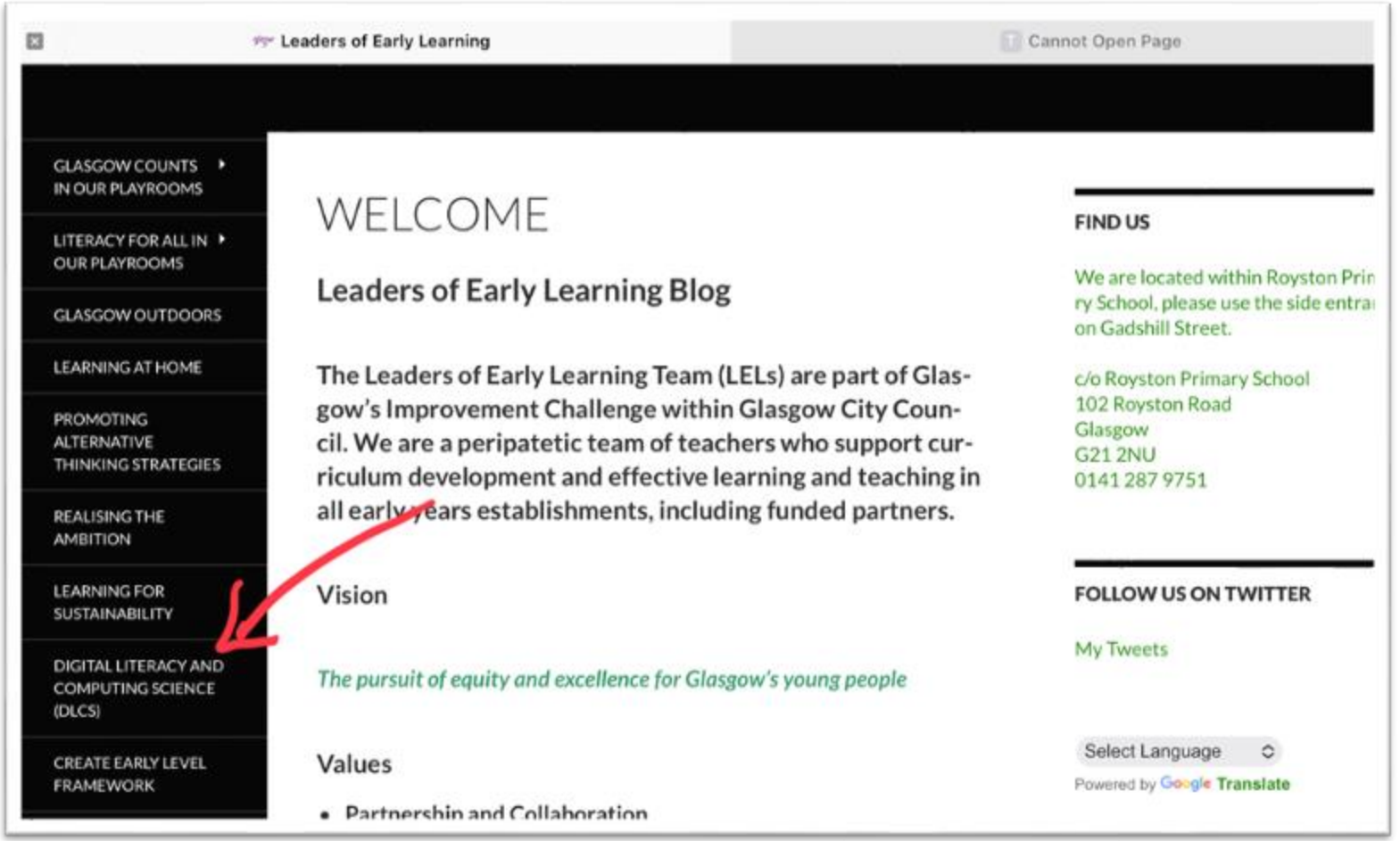


Figure 2

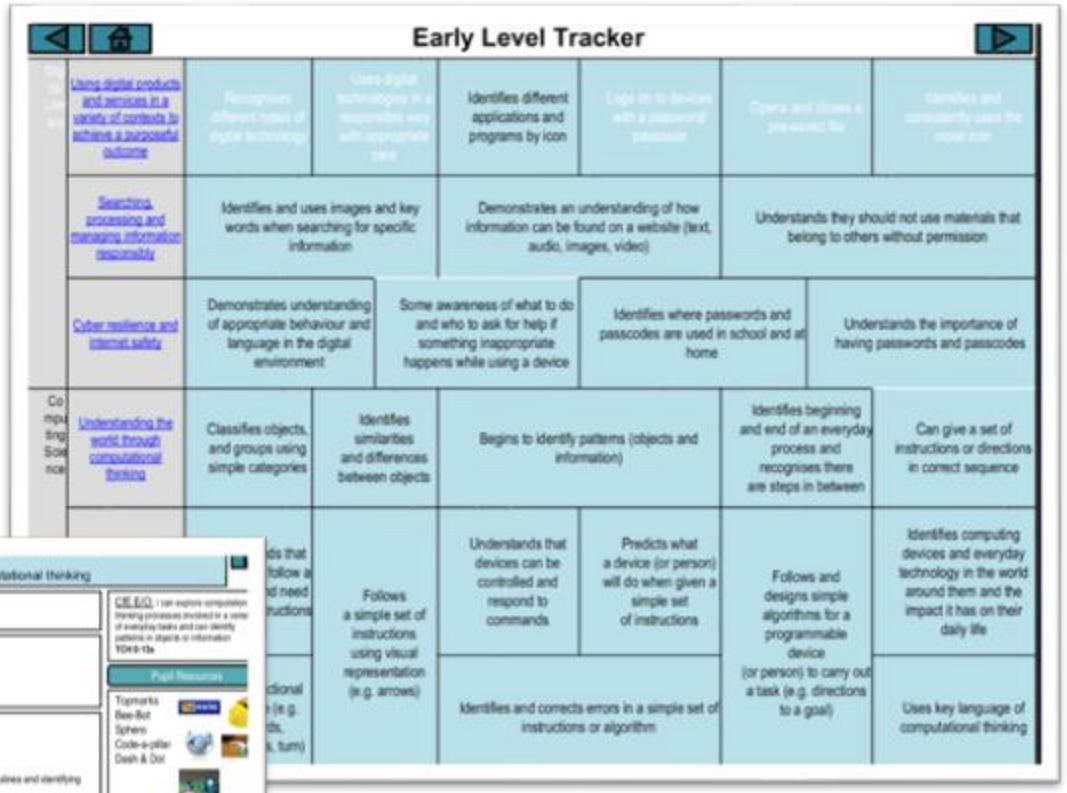
Children should experience a curriculum in which mathematics is learned through play and meaningful contexts where an attuned adult recognises their strengths and interests and builds on these.

Next slide

Digital Literacy and Computing Science



Framework



Early Level Tracker

	Using digital products and services in a variety of contexts to achieve a purposeful outcome	Recognises different types of digital technology	Uses digital technologies in a responsible way with appropriate care	Identifies different applications and programs by icon	Logs on to devices with a password/ passcode	Opens and closes a previously saved file	Identifies and consistently uses the close icon
	Searching, processing and managing information responsibly	Identifies and uses images and key words when searching for specific information		Demonstrates an understanding of how information can be found on a website (text, audio, images, video)		Understands they should not use materials that belong to others without permission	
	Cyber resilience and internet safety	Demonstrates understanding of appropriate behaviour and language in the digital environment	Some awareness of what to do and who to ask for help if something inappropriate happens while using a device		Identifies where passwords and passcodes are used in school and at home	Understands the importance of having passwords and passcodes	
Co mpu ting Scie nce	Understanding the world through computational thinking	Classifies objects, and groups using simple categories	Identifies similarities and differences between objects	Begins to identify patterns (objects and information)		Identifies beginning and end of an everyday process and recognises there are steps in between	Can give a set of instructions or directions in correct sequence
		ds that follow a d need ructions	Follows a simple set of instructions using visual representation (e.g. arrows)	Understands that devices can be controlled and respond to commands	Predicts what a device (or person) will do when given a simple set of instructions	Follows and designs simple algorithms for a programmable device (or person) to carry out a task (e.g. directions to a goal)	Identifies computing devices and everyday technology in the world around them and the impact it has on their daily life
		ctional (e.g. ds, turn)		Identifies and corrects errors in a simple set of instructions or algorithm			Uses key language of computational thinking

Early Level

CS1: Understanding the world through computational thinking

Key lang… directions, commands, sequence, group, sort, organise, share, size, colour, tinker

Cross-curricular links:
(MNU 0-13a) spotting and exploring patterns; copying, continuing and creating own patterns
(MNU 0-20a) collecting and organising objects
(MNU 0-20b) matching objects, sorting using own and others' criteria

Themes/Techniques & Approaches:

Unplugged

- Learners can identify the beginning and end of a process, when given all of the steps. Spend time thinking of familiar routines and identifying the first and last steps – can use visual cards with routines and sequence these
- Begin grouping together found objects or maths concrete resources, with categories that are chosen for the learners, such as grouping by colour, by size, by type, by purpose, by qualities and move on to simple categories chosen by the learner (they may come up with some you hadn't considered)
- When grouping and sharing in maths, you may also group by number of 'things' e.g. sharing eight things into four groups of two.
- Identify repeating visual patterns, using the same categories and groups for sorting, e.g. red-yellow-red-yellow and try to vary the method of pattern. Ask children to create repeating patterns of their own and ask a partner to try to identify the pattern
- Look at overlapping qualities, e.g. in a Venn diagram (you can make these with two hula hoops) to discuss similarities and differences, for example 'this teddy is red AND soft but this truck is red and not soft'
- Compare the Pattern activity (online, but download activity for unplugged use)

Plugged

- Tinker with programmable devices to find out what they do, especially robots that follow patterns of instructions
- Code short routes for programmable devices to follow (e.g. Bee-Bot, Code-a-pillar, Dash & Dot) and start to recognise that the instructions given are the same as the route the device follows

CfE E/O: I can explore computation thinking processes involved in a variety of everyday tasks and can identify patterns in objects or information
TCH 0-15a

Pupil Resources

Topmarks
Bee-Bot
Sphero
Code-a-pillar
Dash & Dot

End of Level Benchmarks:

- Identifies and sequences the main steps in an everyday task to create instructions/an algorithm for example, washing hands
- Classifies objects and groups them into simple categories for example, groups toy bricks according to colour
- Identifies patterns, similarities and differences in objects or information such as colour, size and temperature and simple relationships between them

Framework

Digital Version of GCIP Framework

- WELCOME
- EARLY LEVEL FRAMEWORKS – DIGITAL VERSION
- GLASGOW COUNTS IN OUR PLAYROOMS
- LITERACY FOR ALL IN OUR PLAYROOMS
- GLASGOW OUTDOORS
- LEARNING AT HOME
- PROMOTING ALTERNATIVE THINKING STRATEGIES
- REALISING THE AMBITION
- LEARNING FOR SUSTAINABILITY

EARLY LEVEL FRAMEWORKS – DIGITAL VERSION

Digital Version of the Literacy for ALL, Glasgow Counts and Digital Literacy/Computing Science Frameworks

This works best using an Ipad or when opened in Excel online via One Drive. We are aware of a glitch in Numeracy (1) and (2) when downloaded onto a desktop or a laptop – If some of the boxes only half colour, this can be resolved by double clicking the cell or reselecting from the drop down menu.

LEL Framework – Digital Version

FIND US

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FOLLOW US ON TWITTER

My Tweets

THE SCOTTISH ATTAINMENT CHALLENGE
LITERACY NUMERACY HEALTH & WELLBEING

Glasgow CITY COUNCIL

Interim Tasks

1. Access Blog and Framework
2. Carry out the Evaluation Tool audit and prioritise what changes you want to see.

Glasgow Counts in our Playrooms

THE SCOTTISH ATTAINMENT CHALLENGE
LITERACY NUMERACY
HEALTH & WELLBEING

Glasgow's Improvement Challenge
Unlocking Learning

Professional Learning gtc SCOTLAND 2018 EXCELLENCE AWARD

Overview and Framework Session 1
2023 – 2024

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