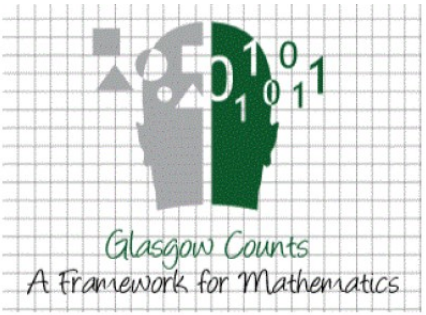
Glasgow Counts
A Framework for Mathematics

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.

Next slide

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.

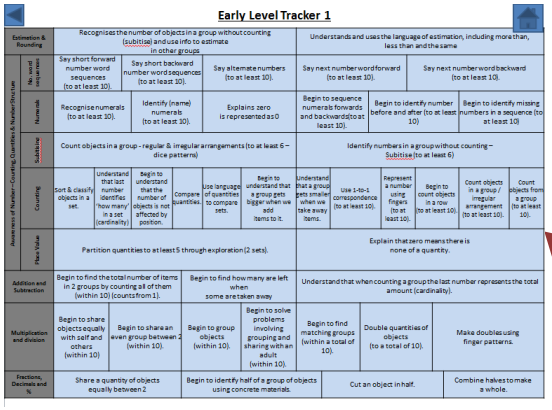
This document does not show a linear progression and **practitioners must ensure they make explicit links across areas of learning. The following pages will give a step by step overview.**

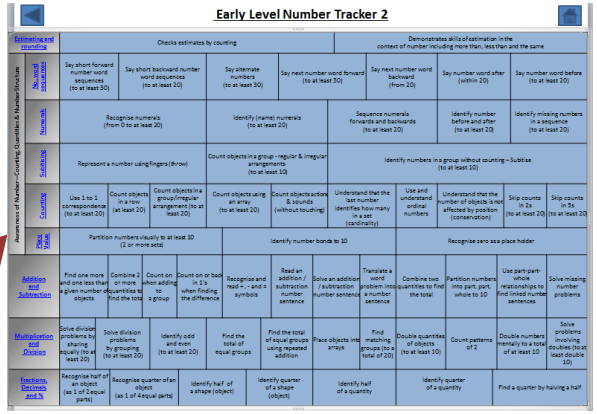
These pathways are a working document and will be updated regularly. Please be flexible in your approach and keep up-to-date with developments to ensure you can best plan for excellent learning and teaching.

Next slide

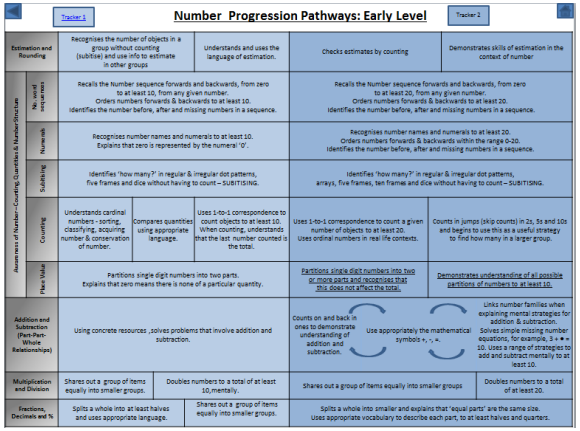
Glasgow Counts – Guidance for use of Tracker

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.

Next slide

Tracker 1

Number Progression Pathways: Early Level

Tracker 2

Estimation and Rounding		Recognises the number of objects in a group without counting (subitise) and use info to estimate in other groups	Understands and uses the language of estimation.	Checks estimates by counting	Demonstrates skills of estimation in the context of number
Awareness of Number–Counting, Quantities & Number Structure	No. word sequences	Recalls the Number sequence forwards and backwards, from zero to at least 10, from any given number. Orders numbers forwards & backwards to at least 10. Identifies the number before, after and missing numbers in a sequence.		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 number names and numerals Explains that zero is represented by the		nd numerals to at least 20. kwards within the range 0-20. nd missing numbers in a sequence.	
	Subitising	Identifies 'how many?' in regular & irregul five frames and dice without having to cou		ular & irregular dot patterns, without having to count – SUBITISING.	
	Counting	Understands cardinal numbers - sorting, classifying, acquiring number & conservation of number.	Compares quantities using appropriate language.	Uses count objects to at least 10. When counting, understands that the last number counted is the total.	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	Partitions single digit numbers into two parts. Explains that zero means there is none of a particular quantity.		Partitions single digit numbers into two or more parts and recognises that this does not affect the total.	Demonstrates understanding of all possible partitions of numbers to at least 10.
Addition and Subtraction (Part-Part-Whole Relationships)		Using concrete resources ,solves problems that involve addition and subtraction.		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 equally into smaller groups.	Doubles numbers to a total of at least 10, mentally.	Shares out a group of items equally into smaller groups	Doubles numbers to a total of at least 20.
Fractions, Decimals and %		Splits a whole into at least halves and uses appropriate language.	Shares out a group of items equally into smaller groups.	Splits a whole into smaller and explains that 'equal parts' are the same size. Uses appropriate vocabulary to describe each part, to at leas	

Overview only

no access to strategies and approaches

Click on one of the trackers

Next slide

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?'	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,		
Subitising	Identifies 'how many?' in re e.g. dot arrangement/on fin frames/dice without co						nt arrangements rs/five frames/ nting up to 6
Counting	When counting objects understands the order in which we say the numbers is always the same (stable order)	number word is said (1-to-1 correspondence)	counted is the name given to the total number of objects in a set (cardinal principle)	number of objects is not affected by position (order irrelevance)	has no effect on the overall total within 0-10 (conservation)		unts 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 e		

Tracker breaks down learning steps for practitioners – effectively the key learning points

Click on an organiser to be taken to the strategies and approaches pages

Next slide

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.

CfE MNU 0-02a
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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
- 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.**

Digital Learning:

more lesson resources here…

Resources

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
  quantity within 0-10
- Beginning to count on and back in ones
  objects or number line within 0-10

Next slide

Glasgow Counts – Guidance for use of Tracker in Early Years

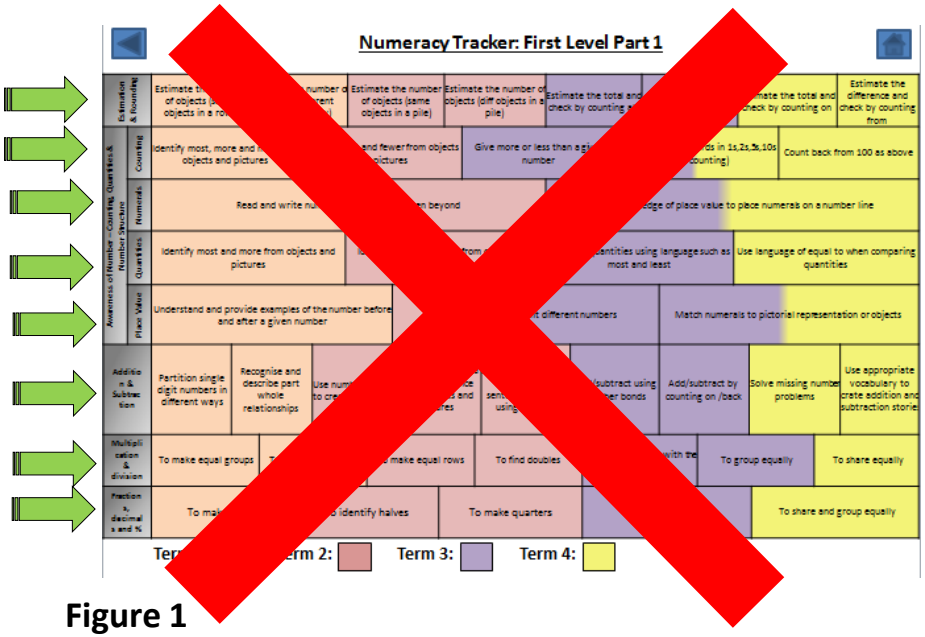


Figure 1

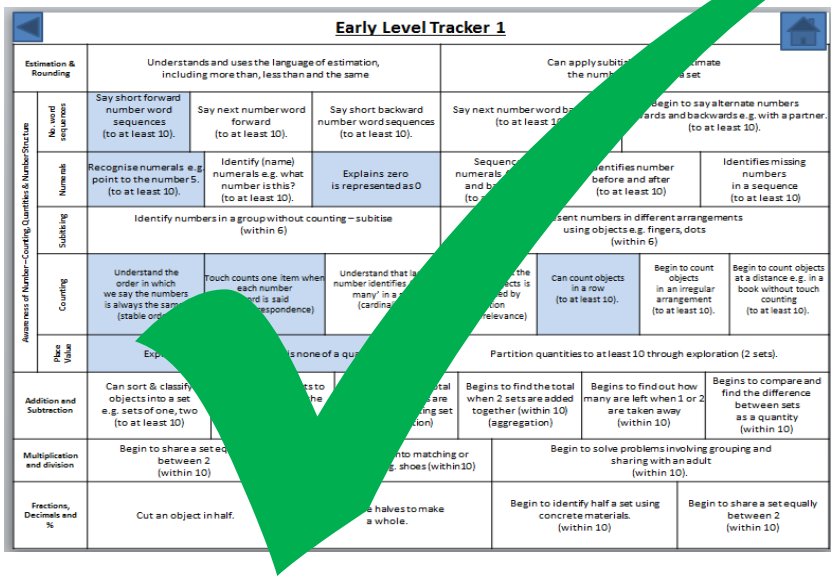


Figure 2

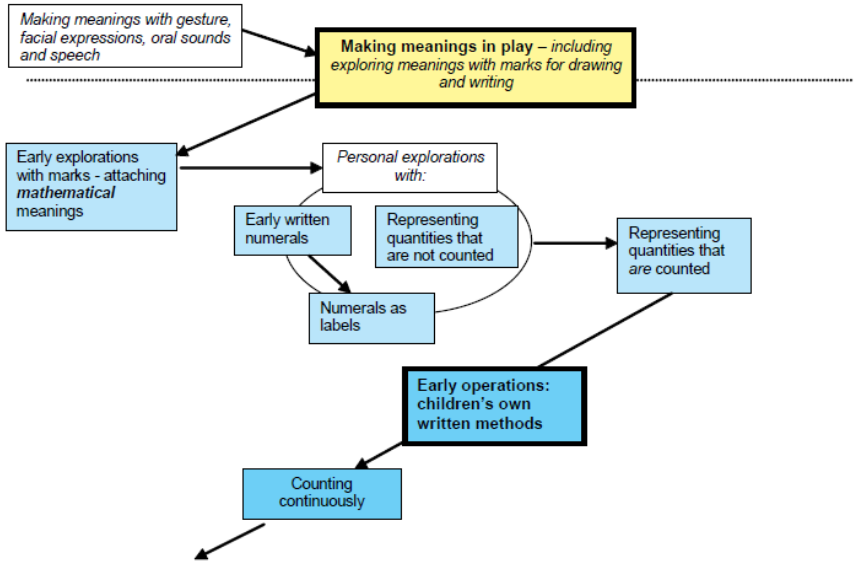
In Early Years we do not teach concepts in isolation across terms (figure 1), instead we look for the opportunities to make connections across the tracker (figure 2). Progression is mapped from left to right across each tracker where possible. However, some concepts should be and will be experienced together e.g. the five principles of counting. The environment must provide opportunities to explore all concepts within tracker 1. The child is at the centre in early years planning. All children will follow a unique pathway in attaining concepts therefore when planning in advance, or in the moment of play, it is important to ensure each individual child's prior attainment and next steps are catered for through effective questioning, extension of resources etc. Educators must endeavour to provide a balance of responding to spontaneous learning opportunities and intentional teaching.

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.

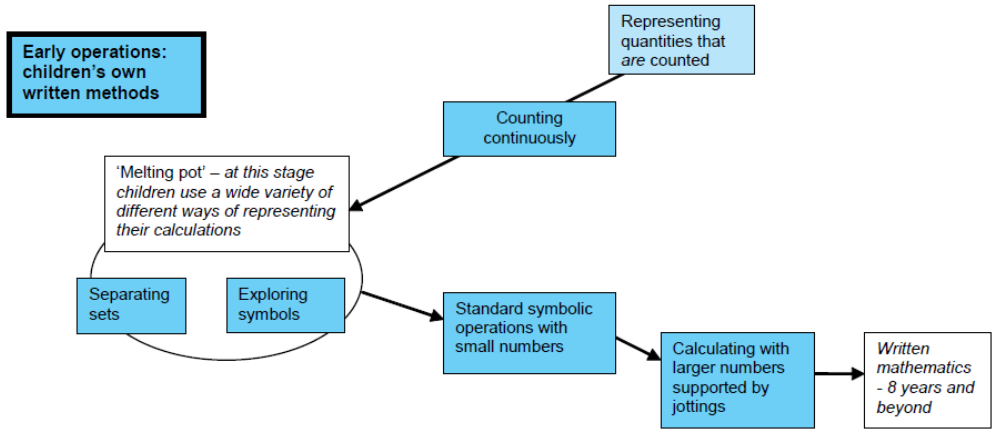
Next slide

Early years - exploration and mark making

In early years the young child requires opportunities everyday to express and **communicate their thinking** both orally and in **making marks**. Children need adults who support this through the **provision** of mark making materials which are accessible and naturally included as part of the play. Children require lots of opportunities to engage in exploration using a variety of interesting resources. The recording of ideas and thoughts should spring forth from this. The child needs opportunities to **talk** about their mark making with an **attuned adult** who is able to support and extend their ideas. Children's **own ideas** should be sensitively fostered and encouraged. Children need to see different ways of recording mathematical ideas for different purposes, therefore it is important adults **model** mathematical mark making and recording. As you can see in the diagrams opposite, children move from expressing their own understandings to more formal abstract written methods. This should happen when they are counting continuously and confident with representations of quantity. This will come from a firm foundation of earlier supported and regular exploration, where mark making is part of a rich play environment with adult encouragement and modelling.



Continuing the journey into children's mathematical graphics



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Elizabeth Carruthers & Maulfry Worthington (2006)
Children's Mathematics: Making Marks, Making Meaning. (2nd Edition) London: Paul Chapman Publishing.

Early exploration with mathematical marks

Sam and the calculator (3 years 6 months)

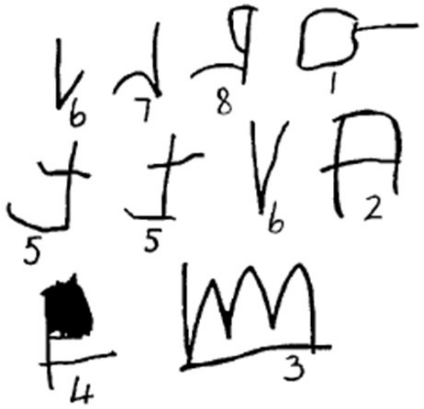
Sam has been watching his friend Bradley play with a calculator and occasionally writing on a piece of paper as he presses the buttons. Sam wants to be a part of this play and when he has fetched a calculator for himself, the two boys talk about the numbers they press, often choosing their age number: '3'. Sam decides to make marks of his own on a piece of paper as they play.

Early written numerals

Alex's numbers (4 years 11 months)

Alex loves writing and, on this occasion, chooses to explore numerals using his own symbols. He adapts the symbol '6' for '7' and '8' and uses elements of standard letters and of numerals he knows. He is consistent in repeating '5' and uses the first letter of his name to stand for '2'.

Alex's explorations illustrate just how much he already knows about written symbols and number, showing that Alex knows his numbers. He soon comes to understand and use standard written numerals.



Numerals as labels

Jessica's clocks (4 years 6 months)

Jessica wanted to write all the 12 numbers in the clock the first time but they did not quite fit so she has tried several times. She gives this to her key person explaining 'It's nearly milk time'. She is making connections with what she knew about time in the nursery (i.e. milk time) and clock time, and finally carries her sign around the nursery to show the other children.

Next slide

Children thinking mathematically: PSRN essential knowledge for Early Years practitioners, The Department for Children, Schools and Families, 2009

Representing quantities that are not counted

Joe's spider (3 years 9 months).

Joe is exploring and playing with a set of toy spiders in the nursery. Joe decides to draw a spider and tells the nursery teacher, 'My spider is Hairy Maclary and he has eight legs.' Joe represents his idea of many legs in his drawing: he shows a growing awareness of number and quantity and is able to describe it.

Representing quantities that are counted

Jenna's raindrops (3 years 9 months).

Jenna draws and counts raindrops in the graphics area. Perhaps the coloured pens remind her of raindrops, or this may be a current interest of hers since many children love to draw rainbows. Jenna finally counts each vertical column before proceeding to the next to reach the total she has drawn.

Next slide

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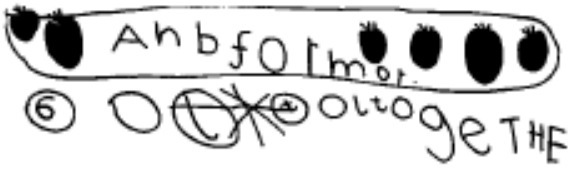
Exploring symbols → *Standard symbolic operations with small numbers*

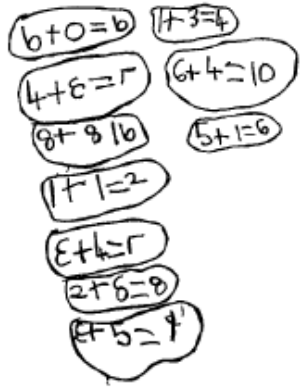
Louisa's strawberries (5 years, 1 month)

Louisa has selected two small quantities of strawberries from a plate her teacher put on the table for her group. She puts them in two small bowls in front of her, and chooses to use paper to help her understand the symbols when 'writing' calculations. Louisa combines drawings, writing and numerals, drawing a box around the first part of her calculation and finally reads this as '2 strawberries and four more. Altogether 6.'



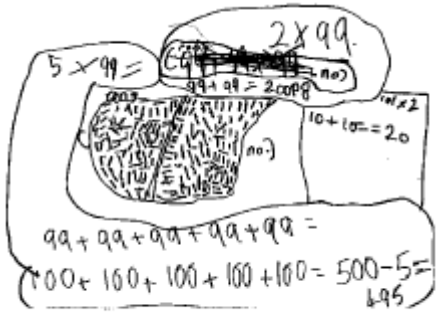
Anna's dice game (5 years 7 months)

In a mixed Reception/Year 1 class, Anna's teacher has introduced a game for the children to play in pairs, each pair with two dice. She invites the children to 'find out how many (dots) you get altogether – when you throw the two dice'. This game provides an opportunity for the children to explore the mathematics in different ways, as counting and perhaps as calculations. Anna (in Year 1) decides to use the opportunity to calculate, using horizontal 'sums' with standard symbols as she combines the totals.



Alison's 99 times table (7 years and 5 months)

Alison is trying to work out the 99 times table. She chooses to begin with '2 x 99', then after much crossing out puts down '99 + 99 = 20098'. This shows logical thinking, since this is how '298' sounds when spoken. (Although Alison's answer is incorrect, her thought process and experimentation is valid. She uses a range of strategies that show the processes she explores, generally self-correcting as she works. Her final strategy for 99 x 5 is to use repeated addition, rounding each '99' to '100' and then subtracting '5' from the combined total to arrive at her answer.



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Early Years - Problem Solving, Reasoning and Fluency

Problem solving must be at the heart of all experiences and should be an **everyday experience** for young children. According to Liz Woodham and Jennie Pennant "Very young children are natural problem solvers. They learn to walk and talk by having a desire to attain their goal, by mimicking others, by trying things out, by making lots of mistakes and adjusting strategies accordingly, and by gradually gaining in confidence" (www.nrich.co.uk, 2018).

To encourage this natural aptitude, children need adults who enable them to have ownership of their learning, to make decisions and create solutions.

Young children need problems:
- which they understand – in familiar contexts
- where the outcomes matter to them - even if imaginary
- where they have control of the process
- involving mathematics with which they are confident.

Opportunities come from:
- providing resources
- giving children responsibility within everyday routines and activities
- identifying issues for discussion (e.g. through maths storytelling)
- spontaneous questioning during play… "how can we make it big enough

Dr Sue Gifford, www.nrich.co.uk, 2018

Next slide

8 skills are embedded in the Numeracy and Mathematics Experiences and Outcomes. These skills cannot be taught in isolation and are developed throughout all topics in our planners.

Interpret questions

select and communicate processes and solutions

justify choice of strategy used

link mathematical concepts

use mathematical vocabulary and notation

use mental agility

reason algebraically

determine the reasonableness of a solution.

Next slide

Early years – interactions and experiences

In early years the young child will be engaged in **holistic experiences** where mathematics is embedded in the everyday and real life. Across all areas of the nursery including outdoors there should be opportunities to engage in joyful and relaxed mathematical play, stories and songs, using numbers, counting and subitising everyday. The attuned adult will engage in **intentional interactions** with the child which begin by **noticing** who children are, their interests and motivations; what children **know, can do and understand** including their **stage of development;** the **child's disposition** towards learning and their **day to day feelings**. The child needs adults who will **notice and name the learning**, sensitively joining in with and extending the child's play by adapting and providing resources, using humour and novelty and engaging in sustained shared thinking (Siraj-Blatchford & Sylva, EPPE Project, 2004). It is important that the adult connects the named learning to the curriculum, to the child's prior learning, to a known interest of the child, to their learning at home and to wider goals/aims/question.

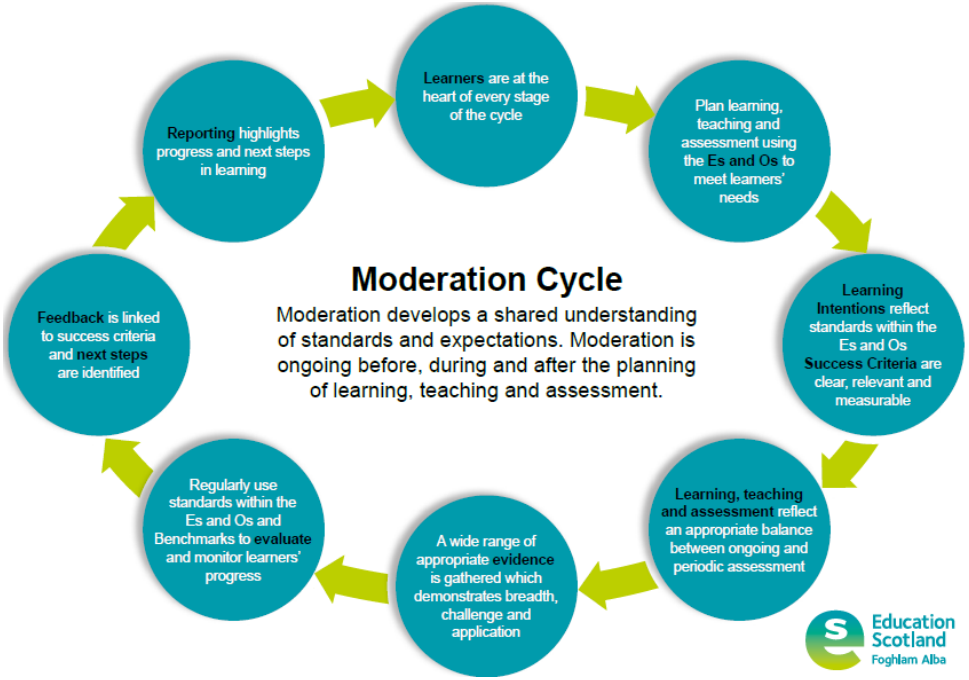
Key pedagogical approaches the attuned adult in early years will use are:
1. Modelling and encouraging reflection on thinking (metacognition) e.g. 'what makes you say/think that?' 'I see, I think, I wonder'
2. Clarifying, confronting errors and misconceptions e.g. 'I think you are taller than John because…' 'are you sure you have 3 grapes?'
3. Problem posing and encouraging prediction e.g. 'can you make it big enough for 5?' 'I wonder what would happen if'
4. Encouraging representation and mark making 'what would this look like if we drew it?' 'let's tally all the birds we see on our walk'
5. Connecting, exploring and elaborating: 'we saw 5 magpies yesterday and today we saw 6' 'what could we try?' '6 is one more than 5'
6. Demonstrating and instructing: 'if we line up our buttons like this (doing it), they might be easier to count' 'try adding one more'
7. Discussing mathematical language: 'what does it mean if we subitise?' 'can you explain to teddy what a pattern is?'
8. Recognising, appreciating and giving feedback: 'oh wow you have counted 8; you checked that carefully'
9. Commentating: 'I am going to add more juice to the jug so that it will be half full'

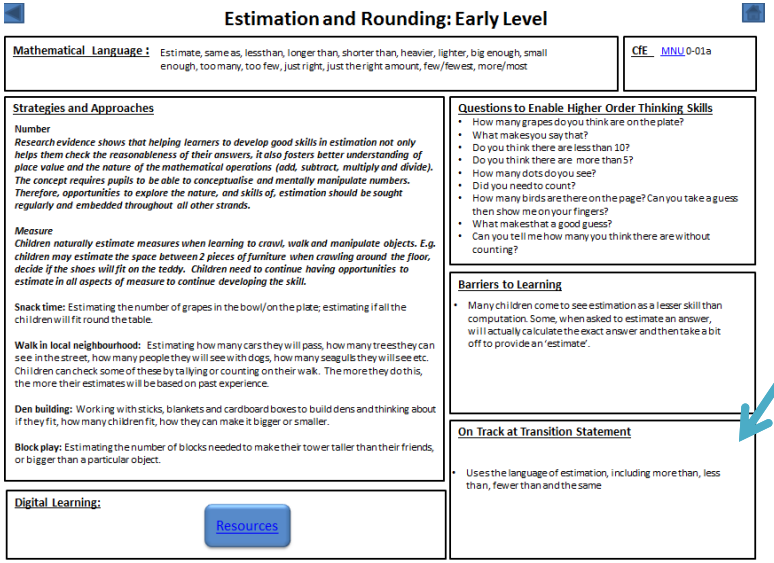
Next slide

Early years – on track at transition decisions

The moderation cycle should be embedded within and beyond early years' establishments so that professional dialogue underpins decisions about achieved learning and next steps. Practitioners need to have a shared understanding of mathematical concepts and progression as outlined in the experiences and outcomes and Glasgow Counts framework. When making 'on track' judgements, establishments should consider:

1. Has a **breadth** of learning been offered and observed?
2. Have children responded consistently well to the level of **challenge**?
3. How have children demonstrated **application** of what they have learned in new and unfamiliar situations?





Estimation and Rounding: Early Level

Mathematical Language : Estimate, same as, lessthan, longer than, shorter than, heavier, lighter, big enough, small enough, too many, too few, just right, just the right amount, few/fewest, more/most

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Strategies and Approaches

Number

Research evidence shows that helping learners to develop good skills in estimation not only helps them check the reasonableness of their answers, it also fosters better understanding of place value and the nature of the mathematical operations (add, subtract, multiply and divide). The concept requires pupils to be able to conceptualise and mentally manipulate numbers. Therefore, opportunities to explore the nature, and skills of, estimation should be sought regularly and embedded throughout all other strands.

Measure

Children naturally estimate measures when learning to crawl, walk and manipulate objects. E.g. children may estimate the space between 2 pieces of furniture when crawling around the floor, decide if the shoes will fit on the teddy. Children need to continue having opportunities to estimate in all aspects of measure to continue developing the skill.

Snack time: Estimating the number of grapes in the bowl/on the plate; estimating if all the children will fit round the table.

Walk in local neighbourhood: Estimating how many cars they will pass, how many trees they can see in the street, how many people they will see with dogs, how many seagulls they will see etc. Children can check some of these by tallying or counting on their walk. The more they do this, the more their estimates will be based on past experience.

Den building: Working with sticks, blankets and cardboard boxes to build dens and thinking about if they fit, how many children fit, how they can make it bigger or smaller.

Block play: Estimating the number of blocks needed to make their tower taller than their friends, or bigger than a particular object.

Digital Learning:

Resources

Questions to Enable Higher Order Thinking Skills

- How many grapes do you think are on the plate?
- What makes you say that?
- Do you think there are less than 10?
- Do you think there are more than 5?
- How many dots do you see?
- Did you need to count?
- How many birds are there on the page? Can you take a guess then show me on your fingers?
- What makes that a good guess?
- Can you tell me how many you think there are without counting?

Barriers to Learning

- Many children come to see estimation as a lesser skill than computation. Some, when asked to estimate an answer, will actually calculate the exact answer and then take a bit off to provide an 'estimate'.

On Track at Transition Statement

- Uses the language of estimation, including more than, less than, fewer than and the same

At the end of their early years' experience, establishments are asked to consider if a child is on track at transition in numeracy and mathematics. When making judgements, practitioners can use the Glasgow Counts 'on track at transition' statements to support decisions. These statements align with the early level benchmarks, capturing the attainment that should typically be achieved by the nursery to primary transition point.

Next slide

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

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.*

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		

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.		

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	

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.

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

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.		

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

Estimation and Rounding: Early Level

Mathematical Language : Estimate, same as, less than, longer than, shorter than, heavier, lighter, big enough, small enough, too many, too few, just right, just the right amount, few/fewest, more/most

CfE MNU 0-01a

Strategies and Approaches

Number

Research evidence shows that helping learners to develop good skills in estimation not only helps them check the reasonableness of their answers, it also fosters better understanding of place value and the nature of the mathematical operations (add, subtract, multiply and divide). The concept requires pupils to be able to conceptualise and mentally manipulate numbers. Therefore, opportunities to explore the nature, and skills of, estimation should be sought regularly and embedded throughout all other strands.

Measure

Children naturally estimate measures when learning to crawl, walk and manipulate objects. E.g. children may estimate the space between 2 pieces of furniture when crawling around the floor, decide if the shoes will fit on the teddy. Children need to continue having opportunities to estimate in all aspects of measure to continue developing the skill.

Snack time: Estimating the number of grapes in the bowl/on the plate; estimating if all the children will fit round the table.

Walk in local neighbourhood: Estimating how many cars they will pass, how many trees they can see in the street, how many people they will see with dogs, how many seagulls they will see etc. Children can check some of these by tallying or counting on their walk. The more they do this, the more their estimates will be based on past experience.

Den building: Working with sticks, blankets and cardboard boxes to build dens and thinking about if they fit, how many children fit, how they can make it bigger or smaller.

Block play: Estimating the number of blocks needed to make their tower taller than their friends, or bigger than a particular object.

Digital Learning:

Resources

Questions to Enable Higher Order Thinking Skills

- How many grapes do you think are on the plate?
- What makes you say that?
- Do you think there are less than 10?
- Do you think there are more than 5?
- How many dots do you see?
- Did you need to count?
- How many birds are there on the page? Can you take a guess then show me on your fingers?
- What makes that a good guess?
- Can you tell me how many you think there are without counting?

Barriers to Learning

- Many children come to see estimation as a lesser skill than computation. Some, when asked to estimate an answer, will actually calculate the exact answer and then take a bit off to provide an 'estimate'.

On Track at Transition Statement

- Uses the language of estimation, including more than, less than, fewer than and the same

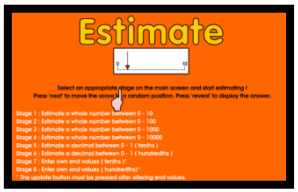
Resources – Estimating

Common Learning Resources

- Any countable objects that can be estimated e.g. shells, sticks, spoons, blocks
- Board games - children can estimate how many they will need to get to a particular square on the game
- Den building materials for estimating size and number
- Pentominos and different 2D shapes– estimate how many will be needed to fill a tray or space

- Blank number line and arrow – estimate the number the arrow is pointing at
- Laces and threading beads – estimating how many will fill the lace
- Sand/water e.g. estimating how many cups of water will fill the jug
- Snack/food/play-dough and baking e.g. estimating how many spoonfuls of flour will fill the bowl, how many cakes we will make from the mixture

Online Resources



The Box Game

Can you work out how many toys are hidden in the box?

Owl's Packing List

Can you help Owl pack to go to his aunty's?

Estimation Station

How many are in the jar? Counting to see who is right.

Stories

- *How Many Jelly Beans? by Yancey Labat*
- *How Big is A Million?* by Anna Milbourne
- *How Many Snails? A Counting Book* by Paul Giganti Jr
- *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
- *How much does a ladybird weigh?* By Andrea Menotti

Number Word Sequences : Early Level

Language number, forwards, up, on, to, backwards, down, back, zero, one, two, three, ten, order, alternate, every other, take turns, next, after, before, first, second, third

CfE MNU 0-02a

Strategies and Approaches

Number sequences are sets of numbers that follow a pattern or a rule in a list. {0, 1, 2, 3, 4, ...} is a very simple sequence

Spontaneous play: There will be opportunities through spontaneous play e.g. pretending to be rockets about to blast off and counting down from 10, counting objects, ordering moveable number lines.

Counting ourselves: Counting how many are in the circle, are lined up (to brush teeth, to go outside). How many have blue eyes? Choose things to which the answer is zero. When children are sitting down for snack or lunch**,** there will be lots of opportunities for the adult to encourage forward and backwards number sequences.

Singing and clapping songs and rhymes such as 1,2,3,4,5 once I caught a fish alive and 10 green bottles should be part of all children's everyday routines.

Board games puzzles and jigsaws that have the numbers in sequence give lots of opportunities e.g. snakes and ladders, children's own personalized board games.

Baking and cooking: counting how many (cakes) are needed, counting back when adding ingredients to the bowl until zero is reached (e.g. adding blueberries to the pancake mix);

Counting down to events/transitions: to birthdays, to the start of the story, until a puppet appears etc.

Counting up and down in motion: on the stairs**,** counting hops, stepping on tree logs, jumps (over obstacles), ladder rungs and puddle play. Children can take turns to say alternate numbers.

Digital Learning

Resources

Questions to Enable Higher Thinking Skills

- Can you (help me) count on/back from 0 to 10?
- Can we/you take turns counting from 0 forwards to 8, 10 backwards to 3?
- What number comes next?
- I'm going to count down from seven. Can you tell me which number comes next?
- What number comes before/after 3?
- What number is missing?
- Can you help me count as we share out the grapes?
- Do we always say the numbers in the same order? Why?
- What would happen if we counted like this 1, 3, 8 (model a mistake)?
- As we jump forwards/backwards can we count out loud together?
- As we count the dots on the dice/move our piece, can we count out loud together?

Barriers to Learning and Misconceptions

- Children sometimes say the numbers out of sequence (1,3,2,5) which may be deliberate or may show lack of understanding of the correct sequence. Young children will be playful with number sequences, creating a sequence that is of interest and meaningful to them. Playing with numbers in this way is important for children's creativity and confidence with number.
- Children may be able to say the numbers in sequence but are not able to apply one number to one object when counting (one to one principle).
- Children may be able to say the numbers in sequence but do not have an understanding that this indicates an increasing quantity (cardinal principle).

On Track at Transition Statement

- Uses ordinal numbers in real life contexts
  e.g. I am first/second/third in the line

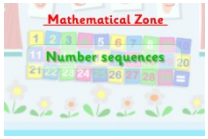
- Recalls the number sequence forwards and backwards within 0-10

Resources – Number Word Sequences

Common Learning Resources

- Any **countable objects** that can become a set e.g. shells, sticks, spoons, blocks
- Digit cards at least 0-10
- Board games; dice and dominos. Snakes and Ladders
- CDs and song lists
- Number lines and friezes
    - on the ground outside (along with bean bag or object to throw on a number and for games)
    - with moveable numbers (e.g. on pegs)
    - with numeral and quantity
    - height charts
    - measuring tapes
- Mark making materials e.g. pens, paper, chalk, paint for recording numerals (including own representations of number sequences)
- Peg board, number jigsaws
- Numbered train carriages, toy cars, blocks
- Number mats, grids and tiles
- Games such as 'What's the Time Mr Wolf' and 'Hide and Seek'
- Parachute games (see *The Little Book of Parachute Play* by Clare Beswick)

Online Resources



https://earlymath.erikson.edu/rules-counting-five-little-monkeys-doorbell-rang/

http://www.bbc.co.uk/learning/schoolradio/subjects/earlylearning/nurserysongs

http://www.teachingyourchild.org.uk/number-songs.htm

http://www.nurseryrhymes.org/numbers.html

Songs

- 1, 2, 3, 4, 5 Once I caught a fish alive (forward number)
- 10 green bottles (backward number)
- 5 little monkeys

Stories

- *One to Ten and Back Again* by Nick Sharratt and Sue Heap
- *My Very First Book of Numbers* by Eric Carle
- *One Lonely Fish* by Andy Mansfield & Thomas Flintham

Numerals: Early Level

Mathematical Language number, numeral, count (forwards/backwards, up/down, on/back, to/from), zero, one, two, three, …ten, order, increasing, decreasing.

CfE MNU 0-02a

Strategies and Approaches

A numeral is a symbol or name that stands for a number. Examples: 3, 49 and 352 are all numerals. A digit is a single symbol used to make numerals. 0, 1, 2, 3, 4, 5, 6, 7, 8 and 9 are the ten digits we use in everyday numerals.

Outdoor games with numbers e.g. hopscotch, skittles, throwing bean bags onto a numbered grid or line etc. Children can be encouraged to count and write down their score.

Numbers in the local area e.g. number of birds spotted, blue cars, post boxes etc. and numeral spotting e.g. door numbers, car license plates, numbers on buses.

Board games: that have numerals and involve counting forwards and backwards e.g. snakes and ladders. Numerals on dice when playing board games

Number /object hunt – hide numeral cards for children to find and match to the correct quantity of objects e.g. logs, stones, blocks, twigs or reverse this and hunt for the objects to match to the numeral.

Making collections and sorting sets with digit cards– how many do you have that are smooth, jaggy, round, noisy? Asking questions about how many…encouraging children to notice and count.

Role play always thinking about meaningful mathematical possibilities for counting e.g. in the bakery have 5 different options of cake displayed with numerals, 5 labelled chairs, purses and coins up to the value of £2, an order form which is a 5 frame to colour in

Welcome time/Group time: Calendar and visual display of attendance with numerals

Labelling and signage: Numbers on chairs, tables, doors, at pegs, on drawers, bikes, jigsaw boxes. Notices with limits e.g. 'only 3 can park here' in the bike car par. A number 10 on the pencil pot to encourage checking.

Snack time: Count how many children are at the table, write this on a display 'today we have 4 children having lunch'. Count out the milk cartons /fruit. When all the food is gone, we have zero.

Digital Learning

Resources

Questions to Enable Higher Order Thinking

- Can you point to the number 6 on the line?
- Can you find the number 4 anywhere in the room? In this street?
- Can you press the number 7 on this phone?
- What number is beside the peg?
- Can you read me the number on this card?
- What number is above the 5 on this phone?
- Can you point to and count on from 0 to 5 (3 to 8, 5 to 10, etc.)?
- Can you point to and count back from 5 to 0 (8 to 3, 10 to 5, etc.)?
- Can you point to / place these numbers in the correct order?
- Find me the number 9
- What number is missing?
- Can you see the number 3 on this page (of the book)?

Barriers to Learning and Misconceptions

- Children may see the number as only a label and not representing a quantity or set of objects (cardinal principle). There needs to be lots of opportunities for **numerals to be linked to quantity**
- Young children will be playful with numerals, creating a sequence that is of interest and meaningful to them. Playing with numbers in this way is important for children's creativity and confidence with number.
- Confusion between numerals; especially 6 and 9

On Track at Transition Statement

- Identifies number before, after and missing numbers in a sequence within 0-10; beginning to use the language before, after and in-between

1	2	3	4	5	6	7	8	9	10

Can you point to the number…?

0		2	3		5	6		8	

Can you put the number 8 in the right place?

		3	4	5	6		8	9	10

Can you match the number 4 with the correct number name?

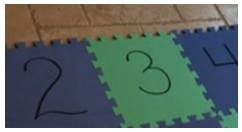
	2		4	5		7		9		11	12		14	15		17		19	20

Can you count backwards to find this number?

Resources – Numerals

Common Learning Resources

- Numerals throughout the indoors e.g. stairs, doors, pegs, backs of chairs, toilet doors, storage boxes
- Sets of objects e.g. shells, sticks, spoons, blocks presented alongside digit cards 0-10
- Board games; dice with numerals



- Number lines:
  - on the ground outside
  - with moveable numbers (e.g. on pegs)
  - with numeral and quantity
  - height charts
  - measuring tapes

- Items with numerals displayed e.g. phones, calculators, jugs, playing cards, packets of items, raffle tickets
- Pens, paper, chalk, paint for recording numerals (including own representations of quantities and numerals)
- Jigsaws with numerals and amounts
- Numicon and cube towers to build alongside digit cards 0-10
- Number mats, grids and tiles
- Games such as 'What's the Time Mr Wolf' and 'Hide and Seek'
- Numerals in the outdoors e.g. cars, house numbers (including own house number), buses, in shops on packets, prices.

Online Resources

Online games and ideas

https://www.topmarks.co.uk/learning-to-count/teddy-numbers

http://www.crickweb.co.uk/ks1numeracy.html

https://www.topmarks.co.uk/ordering-and-sequencing/caterpillar-ordering

https://earlymath.erikson.edu/rules-counting-five-little-monkeys-doorbell-rang/

Songs and Rhymes

http://www.bbc.co.uk/learning/schoolradio/subjects/earlylearning/nurserysongs

http://www.teachingyourchild.org.uk/number-songs.htm

http://www.nurseryrhymes.org/numbers.html

Stories

- *One to Ten and Back Again* by Nick Sharratt and Sue Heap
- *My Very First Book of Numbers* by Eric Carle
- *One Mole Digging a Hole* by Julia Donaldson and Nick Sharratt
- *Ten Black Dots* by Donald Crews
- *Bears At The Beach*, 1-20 by Nikki Yetai
- *10 Little Rubber Ducks* by Eric Carle

Subitising: Early Level

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

CfE MNU 0-01a, MNU 0-02a

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.*

- **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

Resources

Digital Learning

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

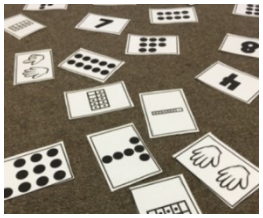
On Track at Transition Statement

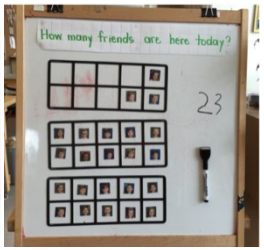
- Represents amounts in different arrangements e.g.dot arrangement/on fingers/five frames/ 10 frames/dice without counting up to 6

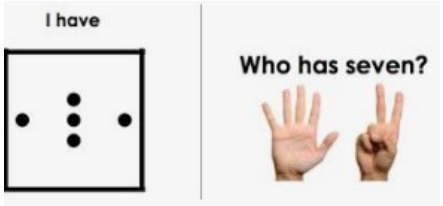
Resources – Subitising

Common Learning Resources

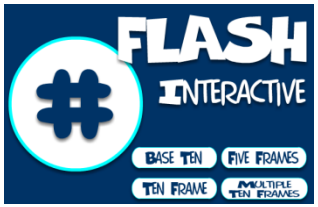
- Sets of counters and objects placed in different arrangements
- Dice
- Dominos
- Subitising cards
- Subitising stones
- Rekenrek
- Children's fingers
- Playing cards







Online Resources



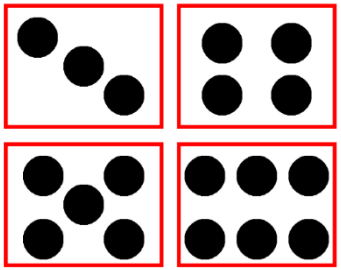
Hidden Jewels
Age 3 to 5

Saying how many there are without counting

Stories

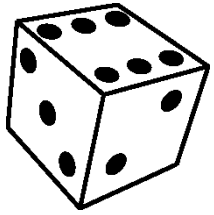
- *Ten Black Dots* by Donald Crews
- *The Very Hungry Caterpillar* by Eric Carle
- *Night Light* by Nicholas Blechman
- *Dog's Colourful Day* by Emma Dodd
- *My Very First Book of Numbers* by Eric Carle
- *Ten Little Rubber Ducks* by Eric Carle
- *How Many Snails?:* A Counting Book

Dominos, dice and playing cards



I see four

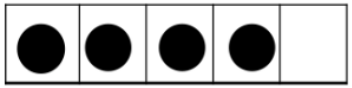
What else do you see?

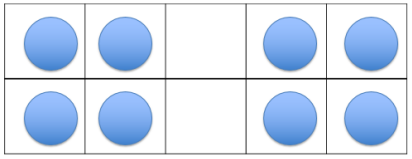


Irregular pattern cards and games

An open frame where children can create their own patterns

Using a five/ten frame create structured patterns





How many altogether?

How many different ways to make 8?

How many children are here today?

Noticing patterns in nature/real world

Counting : Early Level

Language Count, set, items, collection, row, group, add, more, make, altogether

CfE MNU 0-01a
MNU 0-02a

Strategies and Approaches

All children are working towards understanding and using the 5 principles of counting (see https://blogs.glowscotland.org.uk/gc/gccleadersofearlylearning/files/2018/11/counting_a_deceptively_simple_skill.pdf)

Counting walks: take a walk to spot (make predictions beforehand) number of birds (including types), (blue) cars, post boxes, shops, dogs, buses, traffic lights, conkers, things with 4 wheels, pieces of litter, street signs etc. Make time to review how many things were spotted on return to the playroom.

Board games: encourage and model: predicting what number will be rolled, counting the dots on the dice once rolled and comparing with the prediction; counting aloud when moving the counter; thinking about what number is needed to get to a desired spot on the board; thinking aloud e.g. 'what do I need to get to the pig'; creating own board games; creating own dice with various arrangements e.g. only 1-5 or a mix of dots and numbers

Block Play/Water/Sand/Construction: encourage predicting and counting when building and creating. Model thinking aloud 'how many do I need' as well as actions of counting one-to-one

Making collections and sorting sets – how many do you have that are smooth, jaggy, round, noisy? Asking questions about how many…encouraging children to notice and count. Encourage children to think about how they can arrange their sets to make them easier to count e.g. items in rows or regular arrangements (dice, dominos, Numicon)

Role play always thinking about meaningful mathematical possibilities for counting e.g. in the bakery have 5 different options of cake displayed with numerals, 5 labelled chairs, purses and coins up to the value of £2, an order form which is a 5 frame to colour in

Counting ourselves: snack time, lunch time, lining up, as part of singing (children represent the 10 green bottles); using our fingers throughout the day to show amounts

Counting and clapping songs, games , rhymes, syllables every day

Digital Learning

Resources

Questions to Enable Higher Order Thinking

- How many magpies will we see on our walk today? Can you show me how many you think you will see on your fingers?
- Can you count the numbers on the dice?
- What number do you need to get to the cow?
- How can we make these stones easier to count?
- Can we line up in rows of 5 to brush our teeth?
- How many jaggy things are in the bag?

Potential Barriers / Misconceptions

- Children may not touch, point to or move each counter/item alongside saying the number name; this will require lots of modelling (one-to-one principle).

- Children may not realise that, when counting, the last number word is the answer to 'How many?' Some may think that the answer to 'How many?' is answered simply by pointing to each counter and counting from 1. It is important for the adult to model identifying the quantity of the collection is the last one counted, and that this stays the same regardless of where we start counting (cardinality and order irrelevance).

On Track at Transition Statement

- 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)

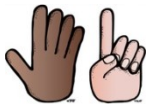
Resources – Counting

Common Learning Resources

Loose Parts

Dominoes

Fingers



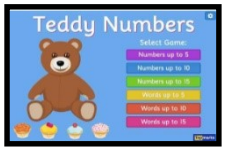
Dice Games

Block Play

Sets of objects

Puddle Play

Online Resources

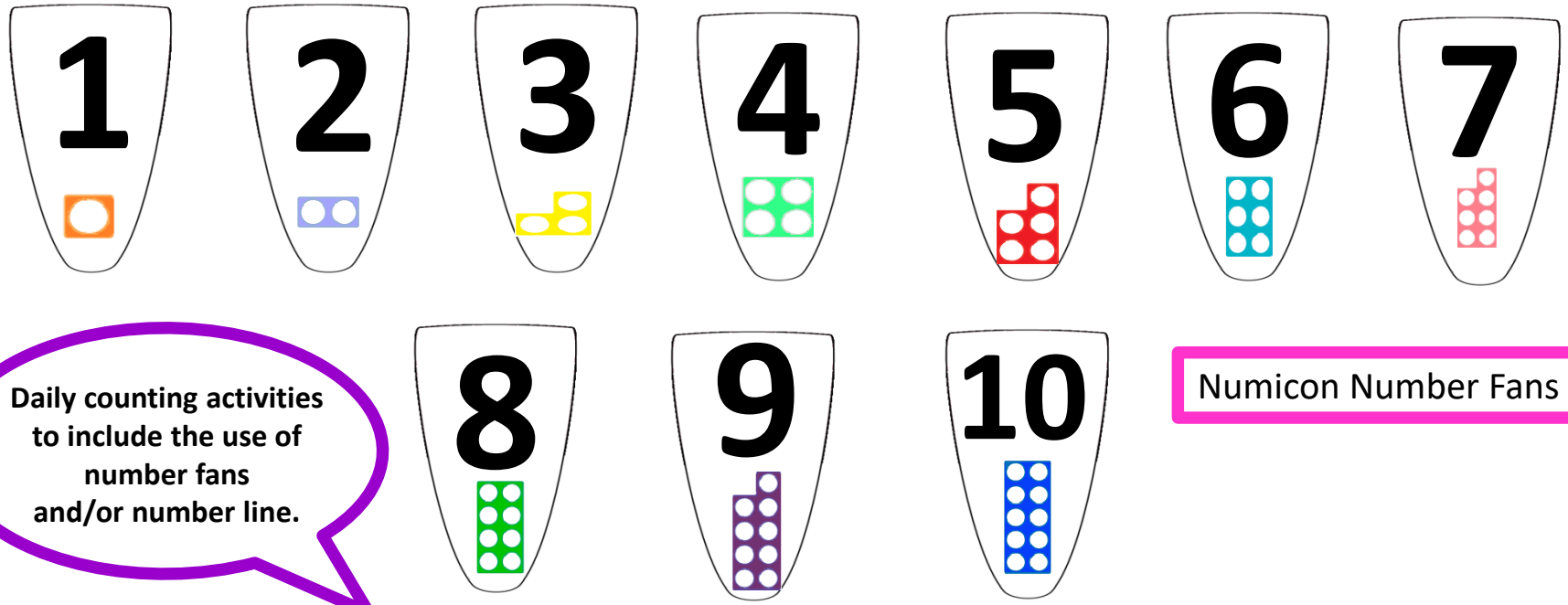


Number Talks
Age 3 to 5

Recognising, creating and describing patterns with numbers

Stories

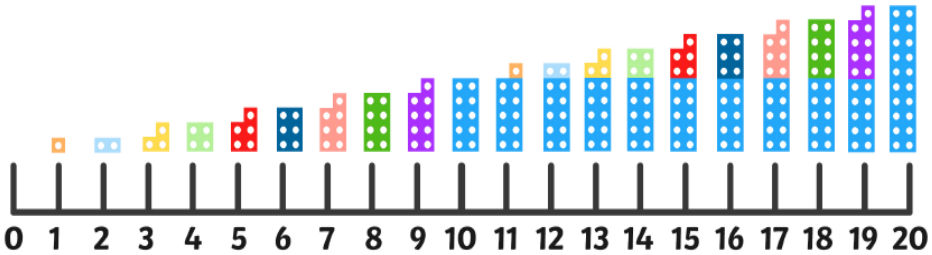
- *Elmer's First Counting Book* by David McKee
- *One Chicky, Two Chicky:* A Counting Book by Cheryl Casey
- *Mama Cat Has Three Kittens* by Denise Fleming
- *Counting Cows* by Michelle Medlock Adams
- *Chicka Chicka 1, 2, 3* by Bill Martin Jr.
- *Ten Red Apples* by Pat Hutchins
- *Over in the Meadow* by Jill McDonald
- *Butterfly Colors and Counting* by Jerry Pallotta
- *On The Launch Pad* By Michael Dahl
- *One is a Snail, Ten is a Crab* by April Pulley Sayre
- *One Gorilla* by Anthony Browne
- *10 Little Rubber Ducks* by Eric Carle
- *How Many Legs* By Kes Gray
- *Centipedes 100 Shoes* by Tony Ross
- *1, 2, 3 Little Donkey* Rindert Kromhout
- *Feast for 10* by Cathryn Falwell



Daily counting activities to include the use of number fans and/or number line.

Numicon Number Fans

Numicon Number Line



It can be difficult to explain to children the mathematical concept of 'five'. Using the Numicon shape for 'five' allows children to see that 'five' looks like 'one less' than six and 'one more' than four.

How many spaces in the green shape?

Can you count the blue shape?

Counting on/back

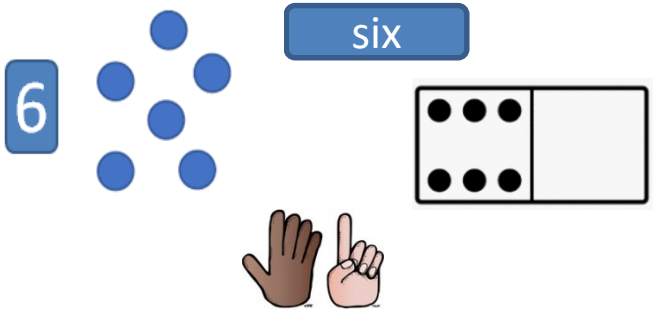
Counting on/back- use actions, puppets and objects to illustrate counting rhymes and songs

- How many claps, taps, barks, clicks…
- Counting on from various numbers
- Counting back from various numbers
- How many more to make 5, 10…?
- Can you clap five times and count aloud at the same time?




Regular and Irregular Patterns

Match to appropriate number/number name



Songs

- Ten Green Bottles
- One, two, three, four, five once I caught a fish alive
- One, Two, Buckle My Shoe
- One for Sorrow
- Five Little Speckled Frogs
- One Potato, Two Potato
- There were 10 in a bed
- 5 green speckled frogs
- 5 little ducks
- Johnny works with one hammer

Song planning sheet for intentional interaction

Observation of Counting Skills

When counting objects watch carefully as the child decides how many there are. Does he/she:

- Give an instantaneous response?
- Was it correct/incorrect? Why
- Can the child explain how they worked it out?
- Did they touch each object as they count?
- Move each object as they count?
- Track the objects with their eyes whilst counting in their head?
- Subitise (‘just knows’)?

Place Value : Early Level

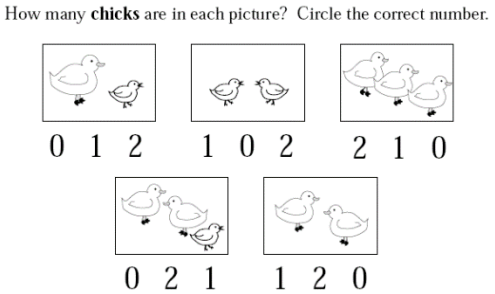
Mathematical Language : sets, seen, unseen, ten frame, altogether, partition, total, combine, part, whole, partition, zero

CfE MNU 0-02a
MNU0-03a

Strategies and Approaches

- Develop a strong sense of ten and allow lots of opportunities for children to partition numbers in many ways.
- Children should have a solid foundation of the 'fiveness of five' before moving onto partitioning within ten.
- Using five/ten frames are excellent resources for developing number sense within the context of ten.
- The concept of zero is usually harder than counting and other early number concepts. It should only be introduced after a child has understood the value of numbers to some extent. The difference between 0 and other numbers is that all of the other numbers have a tangible visual form, whereas 0 does not. Children should have experiences of :-

❖ Zero representing nothing to count
❖ Zero as a placeholder – the difference between 2 and 20 – 0 meaning no units
❖ The value of zero – "I had 5 oranges, then I ate the 5 oranges, now I have zero oranges...!"
❖ Additive Identity – adding 0 to 7 gives the answer 7



- Visually representing numbers up to at least ten and allowing children to use concrete materials to partition in different ways should develop conceptual understanding. Illustrating through the use of a bar model – part, part, whole is an ideal way to record the different representations.

Questions to Enable Higher Order Thinking Skills

- How many different ways can you represent 10?
- I have 8 animals and two paddocks (concrete resources should be used to represent animals and paddocks), I am looking for different ways to split the animals between the two paddocks. How many animals should I put in the first paddock? (put that number (e.g. 3) in the paddock and the remaining animals in the other paddock). How many animals are there in the second paddock? Check that the children's conservation of number skills allow them to understand that there are still 8 animals in total. Can we record this pictorially?

Can you find other ways to organise the animals between the two paddocks?

If I moved 4 pegs to the right side of the hanger, how many would remain on the left hand side?
How do you know?
If you know 4 + 6 = 10, what else do you know?

Barriers to Learning

- Some children confuse the 'teen' and 'ty' numbers e.g. confusing 13 and 30, 19 and 90.
- Reversal of the tens and units figures when identifying larger numbers e.g. 17 becoming 71.
- Even if children are able to count with 2-digit numbers and can recognise and write some 2-digit numbers, they may struggle to comprehend the value of each digit in the number or that the value of each digit in a number is related to its position in the number.
- A sound understanding on the importance of zero as a placeholder needs to be firmly established.
- Language used by teacher when referring to a a set of ten as a 1 etc…

Digital Learning:

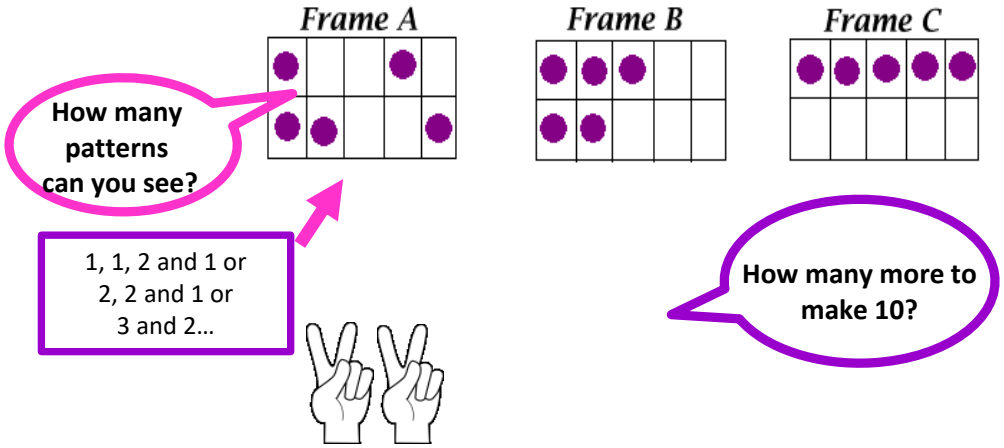
Resources

End of Level Benchmark

- *Explains that zero means there is none of a particular quantity and is represented by the numeral 0.*
- *Partitions quantities to 10 into two or more parts and recognises that this does not affect the total.*

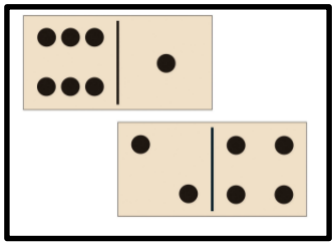
Resources – Place Value

Common Learning Resources



Number bonds can be explored using finger patterns

- *Show me 4. Show me a different 4, etc.*
- *Show me 6. How many more makes 10?*



Online Resources

Stories

- *None the number* by Oliver Jeffers
- *Zero is the leaves on the tree* by Betsy Franco
- *Zero by Kathryn* Otoshi
- *One by Kathryn* Otoshi
- *Two by Kathryn* Otoshi

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.

CfE MNU 0-02a
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 as a quantity – **find the difference**
- taking away items from a set and find a new total – **take away**

Small World: children may be working with farm animals as sets. Sheep or cows may arrive 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.**

Digital Learning:

Resources

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?
- If I take away 2 cartons of milk how many will we have? Will we have enough for everyone?
- If all the people in these 2 cars got on the bus, how many people would be 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.

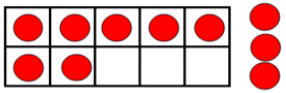
On Track at Transition Statement

- Beginning to compare and find the 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

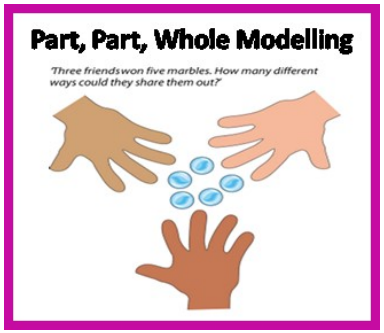
Resources – Addition and Subtraction

Common Learning Resources

Five and Ten Frames



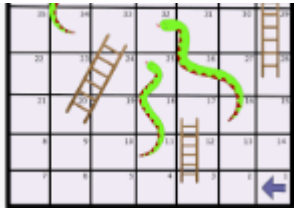
Part, Part, Whole Modelling



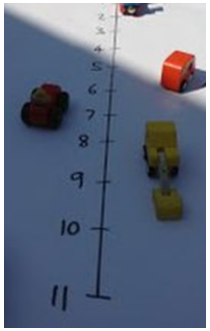
Sets to bring together

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

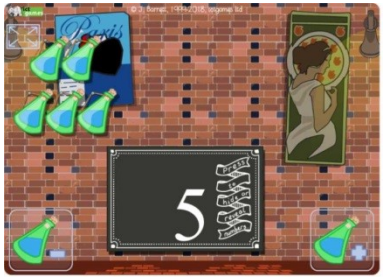
Board games



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

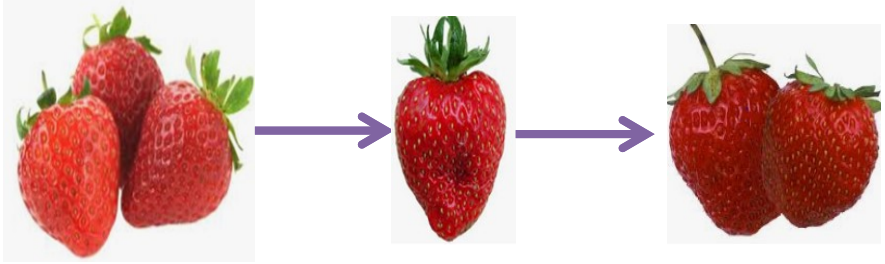
Augmentation – Adding more to an existing amount

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

Early Subtraction

Finding the difference

Reduction - Take away



Multiplication and Division: Early Level

Mathematical Language : Share(s), group(s), pairs, twos, threes, fours, etc. odd, even, array.

CfE MNU 0-02a
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 to engage in early division as a concrete activity by exploring sharing and grouping. Children can observe halves and doubles naturally as part of the sharing and grouping process. Early multiplication may also be explored as skip counting e.g. I say number 1 quietly, number 2 loudly, number 3 quietly, number 4 loudly etc.

Sharing - dividing a set between 2 or more people

- strawberries, grapes or tangerine pieces at snack time
- toys equally with a partner
- cookies equally between 2 teddies
- playing cards
- playdoh

Grouping - creating groups of items from a bigger existing set

- Pairs of shoes
- Pairs of socks – have a box of socks, washing line and pegs
- Finding matching items e.g. ties
- Grouping colours together from a bag of sweets
- Putting animals into 2s or 3s
- Lining up in 2s or 3s
- Playing games outside where we get into groups of 2, 3, 4
- Grouping objects found e.g. conkers into groups of 3

Digital Learning:

Resources

Questions to Enable Higher Order Thinking Skills

- How many groups of strawberries can you make?
- How can you share these between you and Katie?
- How many plates are there? How many cookies are there on each plate?
- Here is some fruit. Can you sort the fruit for me? What can you tell me about the number of each type of fruit?
- Can you share out these crayons with your partner. How many do you have each?
- Can you share these cookies between the teddies? How many cookies do they get each?
- Lets line up with a partner.
- Can you find all the matching socks in the box?

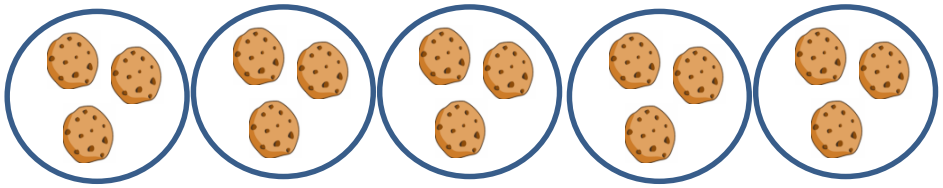
Barriers to Learning and Misconceptions

- It is essential that children are given sufficient thinking time and time to reflect.
- Learners might distribute one item to each group in turn. Alternatively they might use a less systematic sharing strategy, for example, distributing more than one item at a time, to one or more groups.
- Pay close attention to what the child says and does in order to determine the strategy used. Learners may have to count the number in each group from one or be able to subitise. It is important that children can identify that each group has the same number.

On Track at Transition Statement

- 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

Grouping

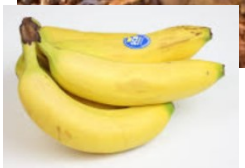


Grouping
"15 biscuits are to be put into 3 packets. How many will there be in each packet?"

Grouping
"Can we line up in lines of 2…3….4?"

Grouping
"How many groups of 2 or pairs can we make from this pile of wellies

Sharing



Sharing

"We have 6 bananas how can we share them equally between 2 monkeys?"

Sharing

"We can give the monkeys 3 bananas each - this way it is fair and they have the same to eat"

Resources – Multiplication and Division

Common Learning Resources

Snack/lunch time food that can be grouped and shared

Box of socks and a washing line for sorting

Everyday objects that can be sorted into groups

Toys that can be grouped and shared e.g. animals

Online Resources

Two Halves

How might you share this cookie with a friend?

Using Books: the Doorbell Rang

Solving problems involving sharing and talking about numbers.

Stories

- *The Doorbell Rang* by Pat Hutchins
- *Equal Shmequal* by Virginia Croll
- *A Fair Bear Share* by Stuart J Murphy
- *One Hundred Angry Ants* By Elinor J Pinczes
- *One Thing* by Lauren Child
- *Each Orange had 8 Slices* by Paul Giganti
- *Where's The Pair?* by Britta Teckentrup

Fractions, Decimals and % : Early Level

Mathematical Language : Half, quarter, share, equally, part, part, whole, amount, shape, object, number, one half, one quarter

CfE MNU 0-02a
MNU0-03a

Strategies and Approaches

It is only appropriate to work with fractions in social and naturally occurring contexts in early years. Children should explore equal and unequal sharing and what it means to have a 'fair share' e.g. my dad might get more sausages than me because he is bigger and needs to eat more food for energy.

Snack time: Children will have opportunities to half whole items e.g. apples, sandwiches, cakes into equal parts. They should observe with the adult that the 2 halves make a whole. Similarly when having water, the jug could be full or half full and allow for discussion. Half full could be marked on the jug for the children to work with. Children should also have opportunities to half a set e.g. grapes, strawberries between themselves and a partner. Snack could therefore be given out to 2 children who must work out how to share it equally between themselves.

Playdough: Children will have opportunities to cut the playdough into halves and share it with others for example making playdoh cakes etc.

Origami: working creatively with paper allows the child to work with halves as they fold and see the 'whole' shape. Children should have access to shapes, card , paper and objects to allow exploration.

Water and sand: when playing, children should be encouraged to notice if containers and jugs are full, half full, empty.

Baking and cooking: filling bowls half way, pouring in half the mixture then the other half, making half the cakes pink and the other half green.

Lacing beads, peg boards: Showing half of the beads, making one half a different colour.

Digital Learning:

Resources

Questions to Enable Higher Order Thinking Skills

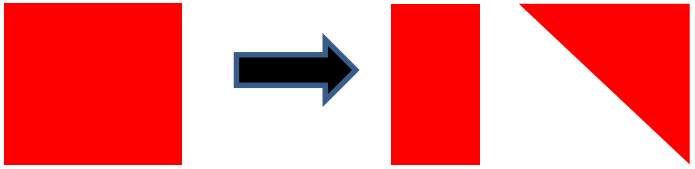
- Can you cut your sandwich in half?
- If we share these grapes between 2 how many will each person get?
- Can we cut your cake into 2 equal pieces?
- Lets pour in some milk so that the cup is half full
- Can you fold your paper in half?
- How many pieces do you have if you fold it again?
- I wonder how many pieces I will have when I fold it again?

Barriers to Learning

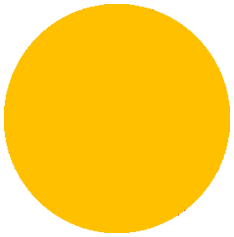
- Children do not have a sound understanding of grouping and sharing
- Children need to explore many representations and uses over a period of time.
- Open up opportunities for pupils to find fractions of objects, shapes and amounts in equal measures.
- Children are unsure of what 'equal' means

On Track at Transition Statement

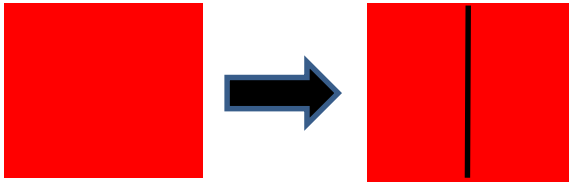
- Splits a whole into smaller parts and explains that equal parts are the same size
- Understands that a whole can be shared equally and unequally

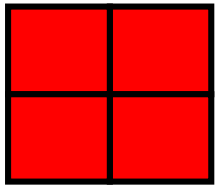


Folding and cutting activities to allow children to see that the shape can be halved in different ways; creating different shapes, but the size stays the same.

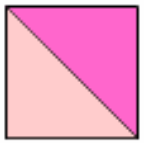


How many different ways can you cut/fold these shapes to make two or four equal parts?





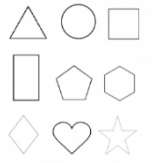
Learning about quarters by halving and halving again



Extending to other shapes/objects.

Resources – Fractions, Decimals and %

Common Learning Resources



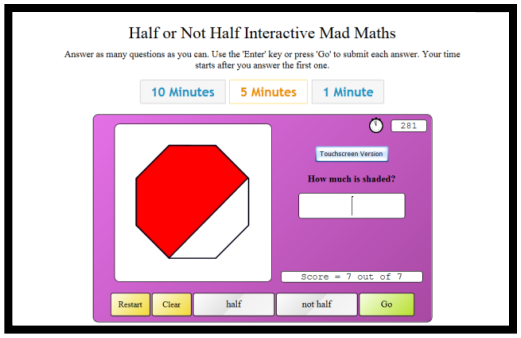
A variety of shaped paper including 2D shapes
What ways can you fold these?

Abacus
"Can you show me half of four?"

Blocks
Can you split these into halves/quarters?

Play-dough
Can you cut your ball in half to make us both a cake?

Online Resources



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Money : Early Level

Mathematical Language : buy, cost, sell, change, spend, spent, amount, value, same, not the same, coin, note, card, price, more, less, least, most, altogether, sale, how much, cheaper, dearer, between, left, pound, pence, penny, pennies, purse, change

CfE MNU 0-09a

Strategies and Approaches

Children should be exposed to situations when we use money in everyday lives (wants and needs). If baking children can go to the shop with a list of ingredients needed, they can help buying snack for the week, they can go to the post office to buy stamps, to the bank to get a stock of coins for their role play area. In play situations, using records, receipts, order forms as a stimulus for money activities e.g. post office, cinema tickets, travel agents, shops, banks, ticket centre etc. Children should be given time to 'handle' coins and associate the coins with the value.

- Talk about money in a range of contexts including the increasing value of the coins, what is on the coins, their favourite coin
- Identify what is the same and what is different about notes and coins: the size, shape and colour, feel.
- Sort notes and coins into sets; have a vote between 2 coins – which is the favourite - then compare the answers of the group.
- When shopping talk about the change you receive if you give too much money
- Begin to add 1 pence coins together to make a total cost (if cardinal understanding is achieved).
- Have the coins as buried treasure in the sand or lost treasure in the water/outdoor/gloop that they have to find
- Put the coins in a feely box or bag where children feel the coin then have to say which one they think it is.

Digital Learning:

Resources

Questions to Enable Higher Order Thinking Skills

- I see, I think, I wonder
- Can you tell me what coin this is?
- Where can we buy the things we need for our cake?
- Which coin has the highest value?
- Why do you learn about money?
- How much would it cost to buy the…?
- Let's go shopping to buy an apple – it costs 10p – can you help me find the coins I need?
- Can you sort these coins from highest to lowest value?
- I have five pennies in my purse, I spend 1p, how much money will be left?
- I have 5 pennies and you have 4 pennies – who has more money? By how much? How do you know?
- What is your favourite coin?
- If you could make a new coin what would it look like? Can you draw it?

Barriers to Learning

- Paying for items with money can be an unknown for some children; lots of people now use credit cards, internet banking and online shopping. This can lead to children seeing money as an abstract concept.
- Some pupils may think that the larger the size of the coin, the greater the value of the coin, for example, a 2p coin is greater in value than a 5p coin.
- Some pupils may think that all coins are circular.

On Track at Transition Statement

- 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

Resources – Money

Common Learning Resources

Real money is best where possible; coins up to £2

Visits to the shops with shopping list and for a real purpose e.g. buying snack or ingredients for baking/cooking

Role-play with a till – a real one if you can. Items should be labelled with prices, purses for money, coins etc.

Online Resources

Stories

- *Bunny Money* by Rosemary Wells
- *The Shopping Basket* by John Burningham
- *Spend It!* by Cinders Mcleod
- *The Happy Penny by* by Jenette Duhart
- *Alexander, who used to be rich last Sunday* by Judith Viorst
- *Lemonade for Sale* by Stuart J. Murphy and Tricia Tusa
- *Its Not Fair!* By Caryn Rivadeneira and Isabel Munoz

Time : Early Level

Mathematical Language : Days of the week: Monday, Tuesday…, months of the year: January, February…, seasons: spring summer…,morning, afternoon, evening, night, light, dark, today, yesterday, tomorrow, o'clock, soon, early, late, hands, before, after, how long…? Always, often, never, sometimes, timer, calendar

CfE MNU 0-10a

Strategies and Approaches

To develop an awareness of time, children should be exposed to regular opportunities to 'see' time around them. There should be a clocks on display both analogue and digital, a calendar on display showing days of the week, months of the year and associated seasons and weather symbols. Use daily opportunities (whilst developing essential language), to ask questions – 'What day was it yesterday?', What comes after…?'

Everyday language of time – use of sand timers, songs etc. to mark the passage of time. Use language such as before, next, soon, later etc. in everyday contexts, morning, afternoon, evening.

Daily routines – "What do we do before/after lunch"? Sequence daily activities in order.

Days of the week and months displayed prominently, able to sequence, encourage before/after, birthdays and special days can be counted down visually and celebrated.

Seasons allow children to observe the changes in weather. Experiment with seasonal activities to allow for explorations of the senses, for example, the crunching of the leaves/snow, the sound of pouring rain, observing changes in plants, animals, lightness and darkness of days

Children's routines home learning can be encouraged with a travelling ted that goes round the nursery and home to find out what children do each of the 7 days. This can be recorded to help the child develop an understanding of the pattern of their day and what happens morning, afternoon and evening. The children can compare days they are at nursery to days they are not.

Digital Learning:

Resources

Questions to Enable Higher Order Thinking Skills

- Show me a month in the summer. And another, and another.
- Always / Sometimes / Never: -You get dressed before you go to school, You have lunch at 12 o'clock
- What do you do after nursery?
- What do we do in autumn? How do things change in autumn?
- What would happen if you could not tell the time?

Barriers to Learning

- Pupils have difficulty establishing an awareness of time and can receive conflicting messages regarding the passing of time. For example, "I'll be with you in a minute", "Give me a second… "
- Some pupils may find sequencing their day difficult if they have no established routines
- Misunderstanding of vocabulary - yesterday, today, and tomorrow are only understandable when they are linked to a specific event or activity that makes the concept of time concrete
- Some children may think that there are ten months in a year

On Track at Transition Statement

- 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

Resources – Time

Common Learning Resources

Can you order the days of the week/months of the year?

What can you tell me about Spring?

Online Resources

Calendar Muddle

This activity focuses on ordering familiar events.

Timing

Putting objects into a container in a certain length of time.

Stories

- *Moon* by Patricia Hegarty
- *Just a Second* by Steve Jenkins
- *Tree: Seasons Come and Seasons Go* by Patricia Hegarty
- *Today* by Julie Morstad
- *Goodbye Autumn, Hello Winter* by Kenard Pak
- *What's the Time Mr Wolf?* by Debi Gliori
- *Cluck O' Clock* by Kes Gray
- *What Time is it Mr Crocodile?* By Judy Sierra
- *Clocks and More Clocks* by Pat Hutchins
- *Noisy Clock Shop* by Jean Berg Horton

Measurement : Length, Mass & Capacity : Early Level

Mathematical Language : Long, short, longer, shorter, longest, shortest, tall,/taller/tallest ,double, half, heavy, light, heavier, lighter, heaviest, lightest, full, empty, more than, less than, half full, half empty, nearly full, nearly empty, almost

CfE MNU 0-11a

Strategies and Approaches

Children should have opportunities to explore length, weight, capacity, area, volume, time and temperature in their day to day learning across the playroom and outdoors.

Children should be thinking about three key aspects:

- **Perception** - the appearance of an object and how it seems e.g. big or small
- **Comparison** - how it compares to other 'normal' examples of that object e.g. bigger or smaller
- **Function** - its use e.g. is it too big or small to eat, to wear, to use?

Sand/Water:

Children can use non-standard units of measure. They should estimate how many cubes long objects are then check using paperclips, cubes, lolly pop sticks. Using Cuisenaire rods can help children 'see' different lengths and make comparisons.

In order to become familiar with standard measures, pupils should have chances to play with measuring tools such as a ruler, weighing scales, tape measures, metre sticks, trundle wheels and containers.

- Share relevant experiences in which measurements of lengths, heights , mass and capacities are used, for example, in baking and other meaningful contexts.
- Describe common objects using measurement language, including tall, heavy and empty.
- Begin to use non-standard units to measure

Digital Learning:

Resources

Questions to Enable Higher Order Thinking Skills

- Show me an item longer than this ruler. And another, and another …
- Show me an item heavier than this book. And another, and another
- What size of puddle do you think this this liquid would make?
- Would this amount make a bigger or smaller puddle?
- What makes you think that?
- Can you order these from … to …?
- Can you find things which are longer than…?
- Can you find things which are shorter than…?
- Can we peg up the ties from shortest to longest?
- Do you agree/disagree with the way your partner has ordered them? Why/why not?
- How many cubes long is your foot? Compare to your partners' foot. Whose foot is longer?

Barriers to Learning

- Some of the language may be problematic for some children e.g. tall for length;
- Poor fine/gross motor skill development may result in 'hands on' practical tasks being difficult for some pupils

On Track at Transition Statement

- Shares relevant experiences in which measurements of lengths, heights, mass and capacities are used, for example, in baking.
- Describes common objects using appropriate measurement language, including tall, heavy and empty.
- Compares and describes lengths, heights, mass and capacities using everyday language, including longer, shorter, taller, heavier, lighter, more and less.
- Estimates, then measures, the length, height, mass and capacity of familiar objects using a range of appropriate non-standard units.

Cuisenaire Rods

Which is longer a line of three red rods or one yellow rod?

How many orange rods do you need to balance the mass of five pencils?

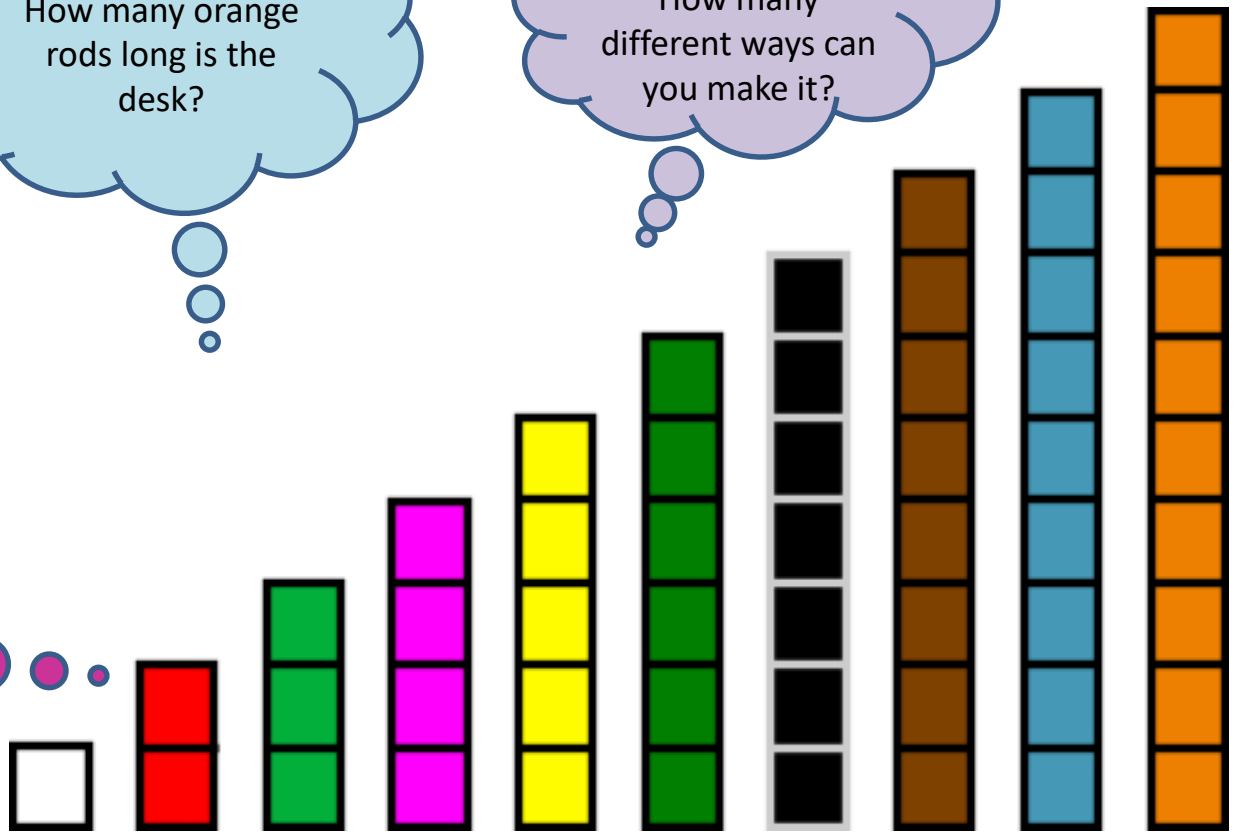
How many white cubes would it take to cover the yellow rod?

How many orange rods long is the desk?

Can you make a train of 8 rods? How many different ways can you make it?

Find an object the same length as the black rod.

Which is longer – one orange or two blues? Estimate first then measure.



Resources – Measurement

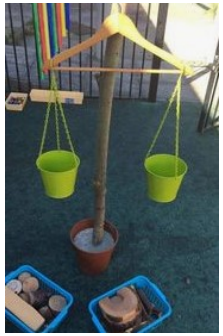
Common Learning Resources

Non-standard units of measure e.g. lego, hands, cubes

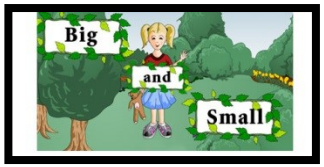
Objects to sort, compare and measure

Height Chart

Scales



Online Resources



Making Caterpillars

Our making caterpillars activity uses clay and dough to introduce measurement.

Long Creatures

Creating long creatures from card, cubes etc.

Presents

Discussing weights of wrapped presents.

I Have a Box

This activity encourages children to guess what is inside your box.

Stories

- *Actual Size* by Steve Jenkins
- *How much does a ladybird Weigh* by Alison Limentani
- *How Tall was a T Rex?* by Alison Limentani
- *How Long is a Whale?* by Alison Limentani
- *The Blue Whale* by Jenni Desmond

Patterns and Relationships : Early Level

Mathematical Language : Pattern, repeat, continue, describe, same, different, predict, next to, before, after, first, second, third...

CfE MNU 0-13a

Strategies and Approaches

Patterns and relationships should be explored across the different areas of the playroom and outdoors. Pattern is all around children; on their clothes, furniture, on wallpaper, in artwork, in nature etc. and this should provide the context for exploring pattern. Children also have a pattern to their day and week. Pattern can be felt, seen and heard. To be confident exploring pattern children need an understanding of before, after and between and will apply this knowledge to pattern recognition and creation. Children should be able to copy, continue and create a pattern or sequence and adults should look for regular and natural opportunities to do this, including number patterns. Children will make patterns quite naturally during their play often with colours and shapes that are of interest; the first step for the adult is to commentate this for the child so they have the language to describe their creative choices and can begin to describe themselves what they are doing and why they are making their choices.

Arts and Crafts: Painting, printing, drawing, cutting and sticking, and using stampers all give opportunities to look at pattern. Children should have a range of media such as paint, chalk, pens and pencils of different thickness, and means of applying the paint such as hands, feet, brushes, vegetables, sponges, combs etc. Different sizes and shapes of paper and materials create interest to apply the patterns.

Sand: Add materials to the sand to encourage pattern work such as shells, feathers, stones, sticks, rakes, combs. Wet sand will make it easier for children to make patterns of sandcastles and shapes.

Table top games and tinker tables: Lacing beads, fuzzy felt, pegs and peg boards, mosaic tiles, buttons

Festivals: For example Rangoli patterns for Divali

Questions to Enable Higher Order Thinking Skills

- What do you notice? (I see, I think, I wonder)
- What shapes can you see in the pattern?
- Can you continue the pattern?
- Can you think of a different pattern?
- What would you add to the pattern?
- What do you think will come next?
- Which number will come next?
- What is the same? What is different?
- Can you describe the pattern?
- Can you draw a picture of your pattern? Can your friend make your pattern?
- Can you think of a pattern for these socks?
- Can you create a pattern for your t-shirt?

Barriers to Learning

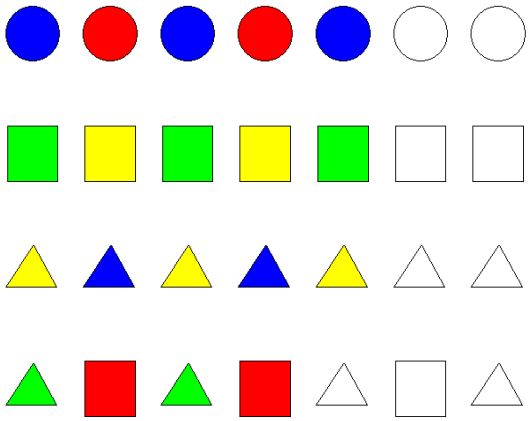
- Children need lots of experience and time to explore pattern making; with experience and opportunities to work with commentating adults they will develop the necessary vocabulary and skills.
- Confidence can be built through opportunities to copy and discuss what makes it a 'pattern'
- Children need an understanding of before, after and between
- Children need an understanding of the objects/ideas that make the pattern.
- No left to right coordination (develops for most by 6 years)

Digital Learning:

Resources

On Track at Transition Statement

- Copies, continues and creates simple patterns involving objects, shapes and numbers.



Can you spot the pattern?

Can you continue the pattern?

Can you make a pattern of your own?

What do you think will come next?

2	4	6	8						

What do you notice about these numbers?

1	3	5							

1	2	1	2	1	2				

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

What do you notice about these numbers?

Can you see any patterns?

What number is next..?
What number is before..?
What number is after...?

Resources – Pattern and Relationships

Common Learning Resources

- Clothes
- Chalk
- Lacing beads
- Fuzzy felt
- Pegs and peg boards
- Mosaic tiles
- Buttons
- Printing and painting materials
- Sand
- Blocks
- Natural materials

Online Resources

Pattern Making

What is your pattern?

Collecting

Children often enjoy making collections of objects like leaves, pebbles or buttons, which they arrange in patterns or put into containers.

Sue Gifford – Developing pattern making with young children
https://nrich.maths.org/13362

Stories

- *Pattern Fish* by Trudy Harris
- *Pattern Bugs* by Trudy Harris
- *The Rainbow Fish* by Marcus Pfister
- *Elmer and Wilbur* by David McKee
- *Rosie's Walk* by Pat Hutchins
- *The Very Quiet Cricket* by Eric Carle
- *Growing Patterns: Fibonacci Numbers in Nature* by Sarah C. Campbell
- *My First Book of Patterns* by Bobby George
- *Leaf Man* by Lois Ehlert
- *Pezzetino* by Leo Lionni

Properties of 2D shapes and 3D objects: Early Level

Mathematical Language : flat, curved, straight, round, solid, corner, face, side, edge,
common 2D shapes: circle, square, rectangle, triangle, rhombus, star;
common 3D objects: cube, cuboid, cone, sphere, cylinder, pyramid

CfE MNU 0-16a

Strategies and Approaches

With 2D shapes and 3D objects children can engage in sorting, grouping, matching, comparing and describing attributes: the edges, corners, faces, rolls/doesn't roll, can stack/can't stack, smooth, pointy, looks like, sharp, smooth, can twist, has holes, is good for/isn't good for etc.

- **Tinker table:** a variety of man-made and natural small objects to tinker with thinking about attributes and features
- **Tiling/jigsaws/puzzles:** Making different shapes and patterns and comparing these with others; completing shape jigsaws and puzzles including shape sorter puzzles.
- **Arts, crafts and messy play**: Printing using a variety of shapes e.g. halved fruit, blocks, sponges, creating shapes with pipe cleaners, clay, play-dough, drawing and describing shapes in shaving foam or gloop.
- **Sand/Water:** fishing 2D and 3D objects out of the water/sand; building structures in wet sand.
- **Blockplay and Construction:** finding shapes to make models, build dens and structures they have designed, both indoors and outdoors. Children should use a variety of man-made and natural objects when building including solid and hollow shapes, blankets, tarpaulin. Not having enough creates a problem solving opportunity.
- **Snack and Lunch times:** Noticing, naming and describing the shape of our food, plate, milk carton and thinking about why it is that shape and not a different one.
- **Shapes all around:** Noticing, naming and describing shapes all around in the playroom, at home and beyond. Looking for shapes in nature e.g. a peacock feather, a shell. Going on a shape walk/hunt and tallying the shapes found.

Digital Learning:

Resources

Questions to Enable Higher Order Thinking Skills

- Tell me about your house? Can you describe it? How many sides? Are they all the same size? Are they straight or curved?
- Can you find a shape with 3 sides?
- How many twigs /pebbles/bottle tops did you use to make your shape?
- What is the same/different about these shapes?
- Which could be the odd one out and why? Could each of them be the odd one out? Explain your thinking.
- What 2d shapes can you see?
- Where can we find circles in the shop?
- Can your shape roll?
- Without using its name, describe a thin plastic shape hidden in a feely bag. My shape has three corners and three sides. What can it be?
- Show a small part of the shape; What shape might it be? Why? What shape can't it be? Why?
- Tell me how you sorted the shapes?
- Can you find all the shapes which are not square?
- If you describe your shape can your friend guess what it is?
- What does this remind you of?
- What do you wonder about this shape?
- What would this shape/object be good for?

Barriers to Learning

- Children need to be given many examples of shapes and precise language related to the concept of a particular shape. Much discussion needs to take place for children to recognise the number of sides and angles of shapes, and whether they are open or closed .

On Track at Transition Statement

- Recognises, describes and sorts common 2D shapes and 3D objects according to various criteria, for example, straight, round, flat and curved.

Resources – 2D shapes and 3D objects

Common Learning Resources

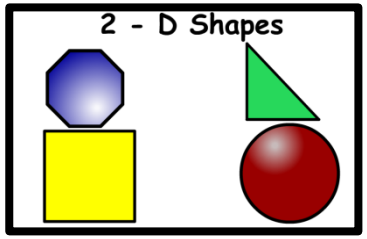
- Pentominos

Book: Pentominoes: Puzzle Shapes to Make You Think by John Millington

- Tangrams

- Sets of 2D and 3D objects both real
  e.g. cereal box for cuboid and manufactured
- Hoops/dishes for sorting
- Shapes in nature and buildings (photographs)
- Blockplay/construction area with plenty of space
- Tinker table with small shapes and objects that can connect
- Painting area with access to shapes for printing and exploring
- Cardboard boxes of various sizes, blankets, poles

Online Resources



Building Towers

Stacking and manipulation of 3D shapes.

Tubes and Tunnels

Exploring tubes and tunnels.

Stories

- *Tangled: A Story about Shapes* by Anne Miranda and Eric Comstock
- *Walter's Wonderful Web* by Tim Hopgood
- *Circle* by Mac Barnett and Jon Klassen
- *Triangle* by Mac Barnett and Jon Klassen
- *Square* by Mac Barnett and Jon Klassen
- *Changes, Changes* by Pat Hutchins
- *When I build with Blocks* by Niki Alling
- *The Shape Song Swingalong* by David Sim
- *Ship Shapes* by Stella Blackstone
- *Figuras y Ratones / Mouse Shapes Bilingual Board Book* by Ellen Stoll Walsh
- *The Shape Game by* Anthony Browne
- *Tangram Cat* by Maranke Rinck

Angles, Symmetry and Transformation: Early Level

Mathematical Language : in front, behind, above, below, left, right, forwards and backwards, under, over, across, symmetry, symmetrical, shade, divide, half, line of symmetry

CfE MNU 0-17a
MNU0-19a

Strategies and Approaches

Positional and directional language can be embedded in playroom activities. The key language should be used to solve problems, be used during everyday movement and in games.

- **Outdoors:** crawl under the tarpaulin, over the bridge, go over the tyres, on the swing, through the grass. Children could design their obstacle course. Also, playing parachute games where children can run under, through objects on and over etc.
- Go on **Bear Hunt (story book):** Take photographs of the journey to use back in the playroom. We went along the path, through the tunnel, through the long grass, across the field…
- **Tinker table**: explore and talk about things that turn, such as the hands of a clock, wheels, taps, keys in locks, screw top lids on jars
- **Block play and Ramp building:** Draw children's attention to the corners are they 'sharp' (acute angles) or 'square' (right angles). Did their car go over the ramp? Creating symmetrical structures e.g. houses, castles, robots
- **Painting/Mosaic tiles/ Peg boards** to explore symmetry including in a context e.g. butterflies, ladybirds, flowers, faces and bodies, spiders
- **Mirrors:** add mirrors to provocations e.g. the tinker table so that children can explore symmetry with an adult and independently
- **Beebots:** with support, creating routes for programmable toys using arrows for forwards, backwards, left and right.
- **Jigsaws/puzzles/paper:** looking for a line of symmetry including blotting paper and folding

Digital Learning:

Resources

Questions to Enable Higher Order Thinking Skills

- How did you get across the field?
- Which shape is below the window?
- Can you build an obstacle course?
- How did you get across the obstacle course?
- Can you draw this?
- Can we create a route for the Beebot?
- Which way will the Beebot go?
- Tell me about your picture?
- What do you notice about the butterfly
  (I see, I think, I wonder)

Barriers to Learning

- Some pupils may think that just dividing a shape into any two pieces is halving but do not understand that they need to be equal pieces (link with fractions and shape).
- The teaching and learning of position and direction is very language based and this may be difficult for some children – activities should be active, modelled and meaningful

On Track at Transition Statement

- Understands and correctly uses some the language of position and direction, including in front, behind, above, below, left, right, forwards and backwards, to solve simple problems in movement games
- Creates symmetrical pictures with one line of symmetry

Resources – Angles, Symmetry and Transformation

Common Learning Resources

Programmable toy and positional language on cards

above

below

inside

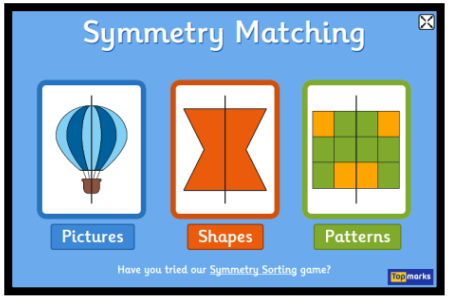
up

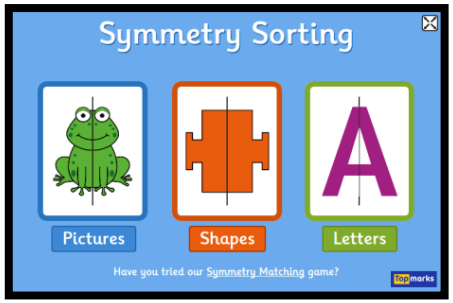
down

between

- **Big materials and equipment:** Tarpaulin, tyres, swings, grass, parachute, tunnels, benches, wooden planks, cones, sticks
- **Objects that turn**: such as the hands of a clock, wheels, taps, keys in locks, screw top lids on jars
- **Block play**
- **Painting/ Mosaic tiles/ Peg boards**
- **Mirrors**
- **Jigsaws and puzzles**
- **Paper**
- **Line of symmetry e.g. a stick, tape**

Online Resources





Stories/Books

- *Above and Below by* Patricia Hegarty and Hanako Clulow
- *We are going on a Bear* Hunt by Michael Rosen
- *Don't forget the Bacon* by Pat Hutchins
- *The Bouncing Ball* by Deborah Kelly
- *Up and Down* by Britta Teckentrup
- *Rosies Walk* by Pat Hutchins
- *Knuffle Bunny* by Mo Willems
- *Follow the Line to School* by Laura Ljungkvist
- *Seeing Symmetry* by Loreen Leedy
- *What is Symmetry in Nature* by Bobbie Calman

Data Handling and Analysis: Early Level

Mathematical Language : count, sort, group, set, list, same, different, table, data, information, graph, tally marks, popular, altogether, most, least

CfE MNU 0-20a
MNU0-20b

Strategies and Approaches

Sorting, matching and data handling are integral to the daily routines and life of the nursery and practitioners should look for natural opportunities to build the children's' skills and understanding. Children should take increasing levels of responsibility for organising resources, making choices and decisions, posing questions to be answered and collecting and displaying data.

Sorting

- **Attributes:** Sorting and grouping based on size, shape, colour, pattern, habitat, texture; initially one attribute and then two. E.g. red and circular.
- **Tidying up:** organising resources into their correct boxes, baskets and containers, sets into correct places e.g. wild animals, farm animals
- **Home corner**: matching items that go together e.g. plates, forks, knives and napkins sitting in front of the chair and the kitchen table
- **Shop or similar:** organising the items on the shelf, money in till.

Matching

- **Items based on attributes e.g.** size, shape, colour, pattern, habitat, texture
- **Pairs of items** that go together: socks, shoes, animal baby and parent

Data Handling

- **Daily data:** on attendance, favourite lunch that day, most popular breakfast, how many birds have been at the bird feeder, transport to nursery
- **Favourites/most common/most popular data:** nursery rhyme, story, song, food, birthdays etc.

Digital Learning:

Resources

Questions to Enable Higher Order Thinking Skills

- Can you tell me something about your…?
- Can you find something the same shape/size/colour as…
- Why are these items the same? Different?
- Why are all these items in your set/not in your set?
- Which set has the fewest/most? How do you know?
- Can you match these objects?
- Why have you matched them like that?
- Which set has the most/fewest items? How can we check?
- What is the favourite nursery rhyme in our nursery?
- How can we find out?
- How will we show other people our data?
- What is the most common/popular story?
- Is your favourite food the most popular?

Barriers to Learning

- Pupils who have difficulty in understanding and handling data skills usually have gaps in their general mathematics understanding that, in turn, can prevent them developing an understanding within handling data activities. Problems may be due to:
  - poor calculation skills;
  - lack of strategies or alternative approaches;
  - data not in a meaningful context for them;
  - not making connections with everyday examples

On Track at Transition Statement

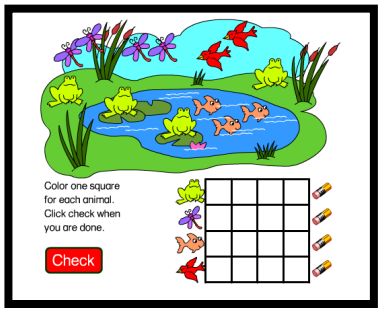
- With support applies counting skills to ask and answer questions and makes relevant choices and decisions based on the data
- With support interprets simple graphs, charts and signs and demonstrates how they support planning, choices and decision making

Resources – Data Handling and Analysis

Common Learning Resources

- Labelled boxes, baskets and containers with sets
- **Home corner**: plates, forks, knives, napkins
- **Imaginative role play area** with resources to organise
- **Matching Items/photographs based on attributes e.g.** size, shape, colour, pattern, habitat, texture
- **Pairs of items** : socks, shoes, animal baby and parent
- **Favourites/most common/most popular data:** nursery rhyme, story, song, food, birthdays etc.
- **Daily data displayed:** on attendance, favourite lunch that day, most popular breakfast, how many birds have been at the bird feeder, transport to nursery

Online Resources



Nrich Activity – Sticky Data
https://nrich.maths.org/7687/note

Stories/Books

- *Above and Below by* Patricia Hegarty and Hanako Clulow
- *We are going on a Bear* Hunt by Michael Rosen
- *Don't forget the Bacon* by Pat Hutchins
- *The Bouncing Ball* by Deborah Kelly
- *Up and Down* by Britta Teckentrup
- *Rosies Walk* by Pat Hutchins

Family Learning Fun

Playing with Lego Talk about how many pieces you are using, the colours, number of dots on the parts.	**Dominos** Play dominos and count your dots!	**Playing cards** What numbers can you see as you are playing? How many hearts can you see? Did you need to count?	**Board Games** When you are playing can you predict what number you need to get to the space you want? Can you count all your jumps? Can you see the number of dots on the dice without counting?
Find the number Go round the house and find as many things that have 4 e.g. a chair.	**Playdoh** Cut your playdoh into different shapes: squares, triangles, rectangles. Can you make halves and quarters?	**Baking** Count the number of ingredients you need? Put them into the bowl talking about how much of each ingredient you need.	**Puddle Jumping** Count your jumps in the puddle; how many can you do in a row?
Den Building Can you build a den that fits you and your favourite teddies?	**Shopping** Help to write the shopping list and look after the money. Can you count the number of things you need and cross items off the list as you buy them?	**Height Chart** Make a height chart on your wall and measure the height of everyone in your family.	**Time** Can you make your own calendar for the wall? Can you talk about what the plan is for each day and order of things: first; then; last

Early Level Number Tracker 2

Estimating and rounding		Checks estimates by counting					Demonstrates skills of estimation in the context of number including more than, less than and the same					
Awareness of Number – Counting, Quantities & Number Structure	No. word sequences	Say short forward number word sequences (to at least 30)	Say short backward number word sequences (to at least 20)	Say alternate numbers (to at least 30)	Say next number word forward (to at least 30)	Say next number word backward (from 20)	Say number word after (within 20)	Say number word before (to at least 20)				
	Numerals	Recognise numerals (from 0 to at least 20)		Identify (name) numerals (to at least 20)		Sequence numerals forwards and backwards (to at least 20)	Identify number before and after (to at least 20)	Identify missing numbers in a sequence (to at least 20)				
	Subitising	Represent a number using fingers (throw)		Count objects in a group - regular & irregular arrangements (to at least 10)		Identify numbers in a group without counting – Subitise (to at least 10)						
	Counting	Use 1 to 1 correspondence (to at least 20)	Count objects in a row (at least 20)	Count objects in a group/irregular arrangement (to at least 20)	Count objects using an array (to at least 20)	Count objects actions & sounds (without touching)	Understand that the last number identifies how many in a set (cardinality)	Use and understand ordinal numbers	Understand that the number of objects is not affected by position (conservation)	Skip counts in 2s (to at least 20)	Skip counts in 5s (to at least 20)	
	Place Value	Partition numbers visually to at least 10 (2 or more sets)			Identify number bonds to 10			Recognise zero as a place holder				
Addition and Subtraction		Find one more and one less than a given number of objects	Combine 2 or more quantities to find the total	Count on when adding to a group	Count on or back in 1's when finding the difference	Recognise and read + , - and = symbols	Read an addition / subtraction number sentence	Solve an addition / subtraction number sentence	Translate a word problem into a number sentence	Combine two quantities to find the total	Partition numbers into part, part, whole to 10	Use part-part-whole relationships to find linked number sentences	Solve missing number problems
Multiplication and Division		Solve division problems by sharing equally (to at least 20)	Solve division problems by grouping (to at least 20)	Identify odd and even (to at least 20)	Find the total of equal groups	Find the total of equal groups using repeated addition	Place objects into arrays	Find matching groups (to a total of 20)	Double quantities of objects (to at least 10)	Count patterns of 2	Double numbers mentally to a total of at least 10	Solve problems involving doubles (to at least double 10)	
Fractions, Decimals and %		Recognise half of an object (as 1 of 2 equal parts)	Recognise quarter of an object (as 1 of 4 equal parts)	Identify half of a shape (object)	Identify quarter of a shape (object)	Identify half of a quantity		Identify quarter of a quantity		Find a quarter by halving a half			

Early Level Money & Measure Tracker 2

Money	Identify coins and assign values Up to £2		Put them in order of value Up to £2	Use 1p, 2p, 5p and 10p coins to pay the exact value for items to al least 10p.	Apply addition and subtraction skills	
Time	Can sequence months in the year	Recognise everyday devices used to measure or display time.	Talk about everyday devices used to measure or display time.	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** / **Mass** / **Capacity**	Compare and describe the lengths, heights ,mass and capacities using everyday language, including longer, shorter, taller, heavier, lighter, more and less.				Estimate them measure the length, height, mass and capacity of familiar objects using a range on non-standard units.	
Patterns and 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.	Find missing numbers on a number line within the range 0-20.	

Early Level Tracker 2
Shape, Position and Movement

Shape, Position and Movement	Shape	Recognise 2D shapes and 3D objects according to various criteria, eg: straight, round, flat and curved.	Describe 2D shapes and 3D objects according to various criteria, eg: straight, round, flat and curved.	Sort 2D shapes and 3D objects according to various criteria, eg: straight, round, flat and curved.
	Angles, Symmetry and Transformation	Understand and correctly use the language of position and direction, including in front, behind, above, below, left, right, forwards and backwards to solve problems in movement games.		Identify, describe and create symmetrical pictures with one line of symmetry.

Early Level Tracker 2
Information Handling

Information Handling	Data Handling and Analysis	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.

Estimation and Rounding: EL2

Mathematical Language : Estimate, more than, less than, same as, longer than, shorter than, heavier, lighter

CfE MNU 0-01a

Strategies and Approaches

Research evidence shows that helping learners to develop good skills in estimation not only helps them check the reasonableness of their answers, it also fosters better understanding of place value and the nature of the mathematical operations (add, subtract, multiply and divide). The concept requires pupils to be able to conceptualise and mentally manipulate numbers. Instead of just adding or subtracting columns, they actually have to analyse each number. Therefore, opportunities to explore the nature, and skills of, estimation should be sought regularly and embedded throughout all other strands.

Using measure as a way of introducing the concept of estimating allows for practical, hands on activities . For example, on one table have a (well sealed) 1 kg bag of sugar or flour and a collection of everyday objects: a book, a shoe, a bag of pebbles. Without using scales, children compare each item with the 'referent' 1 kg bag, deciding if they are heavier or lighter. Another activity could involve having a 500 ml shampoo bottle and a selection of larger and smaller plastic bottles (chosen so their shape does not make it immediately obvious that they could contain more or less). Exploration of the associated vocabulary throughout activities.

Number activities – give children a group of objects and ask them to guess how many there are. If children have been taught to subitise, they will find this much easier to do. The idea is that they use their existing knowledge to make an educated assumption . They would then be asked to count the objects in order to check how close they were.

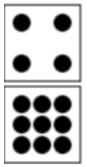
Progression – addition and subtraction - child might be asked to add 12 and 13. A way to estimate the answer would be to remember that both numbers are close to ten, and ten plus ten is 20, so if their answer was 35, they would know that this question would need re-doing.

Digital Learning:

Resources

Questions to Enable Higher Order Thinking Skills

- How many sweets do you think are on the plate?
- What makes you say that?
- Do you think there are less than 20?
- Do you think there are more than 10?



- How many dots do you see?
- Did you need to count?

Barriers to Learning

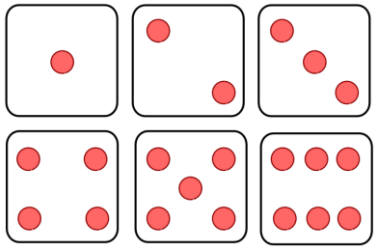
- Many children come to see estimation as a lesser skill than computation. Some, when asked to estimate an answer, will actually calculate the exact answer and then take a bit off to provide an 'estimate'.
- Pupils must have knowledge of how the number system works. For example, if their number sense has not been full developed, they would not realise that 12 and 13 could not be 35.

End of Level Benchmark

- *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.*

Resources – Estimating

Common Classroom Resources

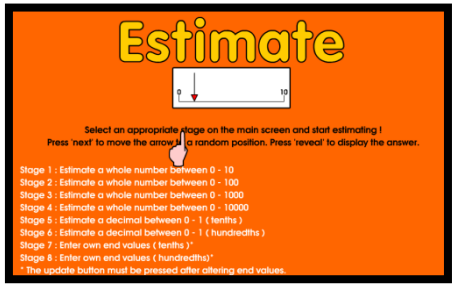


Our school resources:
(textbooks, HAM, Big Maths, worksheets, etc)

Online Resources

Let's play the estimating game!

Estimating Penguins



Nrich: Owl's Packing List
https://nrich.maths.org/12744

Nrich – I have a box
https://nrich.maths.org/10212

Number Word Sequences : EL2

Mathematical Language : forwards, backwards, missing, next, before, after, in between, biggest, smallest

CfE MNU 0-02a
MNU0-03a

Strategies and Approaches

Opportunities for learning number word sequences should form part of daily math time. Generally this should be oral responses.

Children need lots of practice when learning the meaning of 'before' and 'after' before they can apply it to number. Use the pre number concept of before, between and after in daily living situations to reinforce it before formally introducing ,'Can you tell me the number before… after…? Introduce through activities such as:-

1. Lining the children up and asking them who comes before the others in line.
2. Using the children as a human number line and asking a variety of question using associated language

- Who has the number before…?
- Who has the number after…?
- Who has the number between…?

3. Practice, practice, practice. Counters, chairs, any toy object can be used to practice. Line them up in different patterns and have the children state their position.
When introducing the forward and backward number word sequences, concentrate on number words 1 to 5 before moving to 1 to 10. The backward number word sequence is often less familiar and as such, needs to be a persistent focus as it is fundamental in learning how to count back and subtract.

Using a counting stick is a versatile teaching tool and, can be used to engage the children and develop their mathematical thinking.

Digital Learning:

Resources

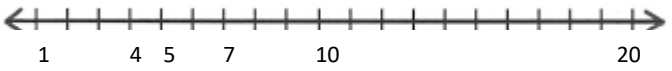
Questions to Enable Higher Order Thinking Skills

Here is part of a number square. Can you say the numbers you see 1,2,3,4 etc…Some of the numbers are missing. Can you tell me the missing numbers?

1	2	3	4	5	6
7	8	9	10	11	12
13	14	15	16		
19	20	21			
25	26				

Can you count forwards and backwards the numbers you see on the number line? Where would the number 4 go on the number line/washing line? How do you know?

Here is a number line. Where would the number 9 be placed on the number line? What number would come before/after/between?



Barriers to Learning

- Children sometimes count out of sequence (1,3,2,5)
- 1 to 1 match – say 12345 when there are only 3 objects present i.e.) skim over the objects chanting count – but not matching!
- Some pupils may appear to be counting confidently but they may just be mimicking the rhythm of the counting pattern.
- Some pupils may not be confident in counting over the tens boundaries
- Some pupils may not understand that a number can be used to show/ label the final (cardinal) value of the set of objects being counted, i.e. the final number that they have said represents the value of the objects in the set.
- Some pupils may muddle the 'teen' and the 'ty' numbers.
- Some pupils may read the units digit before the tens digit.

End of Level Benchmark

- *Recalls the number sequence forwards within the range 0 - 30, from any given number.*
- *Recalls the number sequence backwards from 20.*

COUNTING FORWARDS/BACKWARDS

The stick can be used simply to count forwards and backwards along the stick. Forward counting should be from left to right as the pupils are looking at it. This will be from the right hand side as the teacher holds the stick in front of him/her.

CHANGING PACE

The teacher can vary the pace at which the pupils count. If the counting task is challenging, slow counting will provide additional thinking time. The teacher can introduce a pause and continue counting or a position on the stick can be indicated by a marker (e.g. a piece of ribbon/string, elastic band, roll of sellotape) so that the pupils will know in advance where the pause or rest will happen and then count on to the end of the stick.

THE BOOMERANG STICK

Place a marker at a position along the stick. Count up to the marker and back to the start again. This is useful when beginning to work on counting backwards.

THE HICCUP STICK

The 'Hiccup Stick' combines counting forward and backwards. Counting takes place as usual until a 'hiccup' sound is heard. On the hiccup you count back to the previous number and then count on e.g. counting in 2's 2, 4, 6, 8, hiccup, 8, 10, 12, etc.

THE HUSH STICK

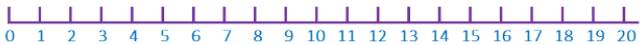
The 'Hush' stick combines counting aloud with counting silently. At the 'hush' number pupils continue counting but don't say the hush number aloud e.g. counting in 10's - 10, 20, 30, 40, hush, 60, 70, 80, hush, 100. The 'hush' can be indicated in a number of ways:

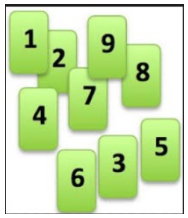
- by using a marker to indicate the 'hush' position.
- if using the stick as a number strip then touch the section with one finger instead of grabbing the whole section.
- if using the stick as a number line then indicate a 'hush' position by touching the underside of the stick

Resources – Number Word Sequences

Common Classroom Resources

Missing Numbers

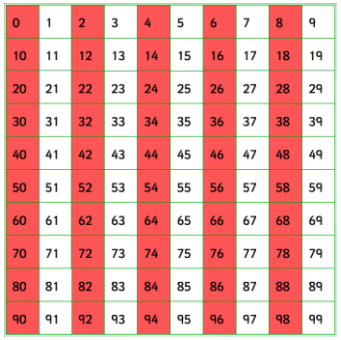


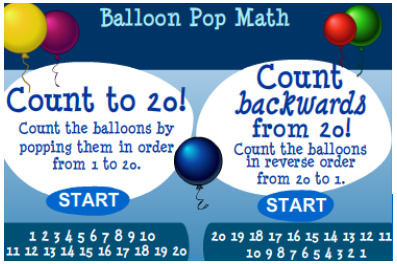


Digit Cards

Our school resources:
(textbooks, HAM, Big Maths, worksheets, etc)

Online Resources





numbers before and after

Simple Number Sequences, Number Patterns, Counting On and Back-
http://www.primaryresources.co.uk/maths/mathsB3.htm

NRICH – Counting on and back investigations
https://nrich.maths.org/public/leg.php?group_id=1&code=2

Numerals : EL2

Mathematical Language : number, numeral, count (forwards/backwards, up/down, on/back, to/from), zero, one, two, three,…twenty, order, bigger, smaller, decreasing, random same, equal

CfE MNU 0-02a
MNU0-03a

Strategies and Approaches

Children need to be immersed in number – numbers, associated number names and corresponding values for each number. Number recognition is vital for preparing young children for a range of basic mathematical concepts such as addition and subtraction.

Place numeral cards in order and say the number as you point to each one in turn, show the associated number name as you point to each numeral and allow the children time to repeat. Continue this and count the numbers forwards and backwards each time (it may be easier to work within a limited number range at first. For example, focus on numbers 1-5 before moving onto numbers 1-10.
Use digit cards and arrange randomly. Point to a variety of numbers, asking children to say what number it is.

Lots of exposure to hands on activities will help consolidate learning.
Examples could include:-

- Creating sensory art as a number using sand, glitter, foam etc..
- Go on a number hunt matching with number name and/or object of the same value
- Follow a number maze using making tape and adding number name after completion
- Create a parking lot asking children to place the green car in parking space number 8…

- Use bubble wrap/balloons and ask children to pop a given number, they must select the appropriate number name beforehand
- Find and match playing cards
- Have numbers and number names in two plastic cups/containers. Children select one from each cup hoping to find a matching pair.

Digital Learning:

Resources

Questions to Enable Higher Order Thinking Skills

- Can you roll the dice (or die), add the dots, and show me the number you have rolled in as many ways as possible?
- Which numbers are missing from this number line? How do you know?
- Which is greater/smaller?
- Can you find examples of numbers/number names in our class/school/environment/your home?
- How many times can you spot the number…. on the way home today?
- Look at car number plates – what numbers can you see?
- I'm going to start counting from 6 and I'm going to count up to this number(show number and/or number name), can you tell me when to stop?

Barriers to Learning

- Some pupils may muddle the 'teen' and the 'ty' numbers
- Some pupils have difficulty making meaningful connections within and across mathematical experiences. For example, a pupil may not readily understand the relation between numbers and the quantities they represent. What does the number 7 really mean to them? Pupils should be shown the number/number name and that many objects together so that they can see the relationship between the number they see and the number of objects portrayed
- Confusion between numbers; especially 6 and 9, 12 and 20 …
- Remembering which digit comes first when reaching 'teens' numbers. For example, 21 becomes 12, 32 becomes 23 etc.…

End of Level Benchmark

- *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.*

1	2	3	4	5	6	7	8	9	10

Can you point to the number…?

1		3	4		6	7		9	10

Can you put the number 8 in the right place?

		3	4	5	6		8	9	10

Can you match the number 4 with the correct number name?

	2		4	5		7		9		11	12		14	15		17		19	20

Can you count backwards to find this number?

Resources – Numerals

Common Classroom Resources

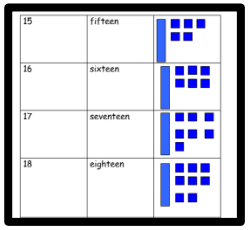
Use a small portion of a **100 square** – cut into number lines (1 – 10 / 11-20)
Have the associated number names available. Ask children to match numeral with appropriate number name. Cross it off the number strip. Winner is the first person to finish their number line.

11	12	13	14	15	16	17	18	19	20

1	2	3	4	5
6	7	8	9	10
11	12	13	14	15
16	17	18	19	20

Can you point to the number 16?

Which number is this?

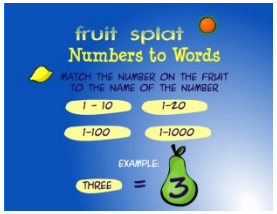


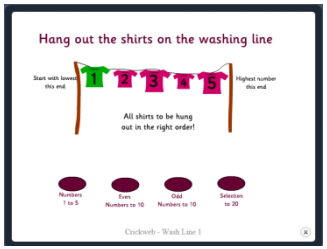
Base ten material - matching games – matching number, number name with base ten material.

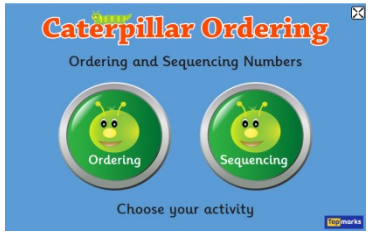
Our school resources:

(textbooks, HAM, Big Maths, worksheets, etc)

Online Resources







number puzzles
1-20

1-10 picture cards

Number Sequences – Before and After – Tes
https://www.tes.com/teaching-resource/number-sequences-before-and-after-6326842

Subitising: EL2

Mathematical Language : How many, dots, patterns, objects, flash, dice, domino, five/ten-frame, array.

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MNU0-03a

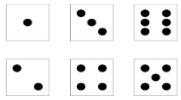
Strategies and Approaches

- Using fingers as part of daily math warm up sessions- What do you see?/How do you know? How many more to make…? Can children grow the number (counting one at a time), can they throw a 4 – without counting?
- Count how many in regular/irregular patterns – initially children may have to count each object.
- Regular exposure and daily activities to promote this will build up children's perceptual subitising. Using dice/dominoes/five/ten frames/counters daily will help the development of this skill.

Subitising is an essential part of developing number sense- it helps them to relate numbers to actual groups of objects. By looking at a group of items, children can start to develop an understanding of how a number is made up. For example, seven dots could be seen as a set of three dots and a set of four dots, or a set of six dots and one dot. This understanding of part- part- whole relationships helps children to separate and combine numbers and accelerates Understanding of addition and subtraction. (*https://www.yellow-door.net/blog/what-is-subitising/*)

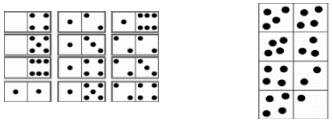
Perceptual Subitising- instantly recognising the number of objects/items without counting

Regular Patterns



Conceptual Subitising- use recognisable patterns to help you get the same instant recognition without having to count

Irregular Patterns



Questions to Enable Higher Order Thinking Skills

Flash a dot card at children for a brief period of time and allow children to share what they saw on the card-

- Tell a friend how many dots you saw.
- Tell a friend what the dot pattern looked like.
- Flash a dot card with a different arrangement of three dots –

- How many dots did you see?
- Did you see 3 dots again?
- Were the dots arranged in the same way?
- Let's draw what the dots looked like.
- Do your dots look like the dots on the card?
- How many dots on the first card/second card?
- Do both cards have 3 dots on them/ Are the dots in the same arrangement?
- Can 3 dots be arranged in different ways? If we re-arrange the dots, do we still have 3 dots?
- I saw a card with 4 dots on it. What could the card look like?
- How do you know how many dots there are?
- Did anyone work out the number of dots differently?
- How many more dots do you need to make…?

Barriers to Learning

- 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

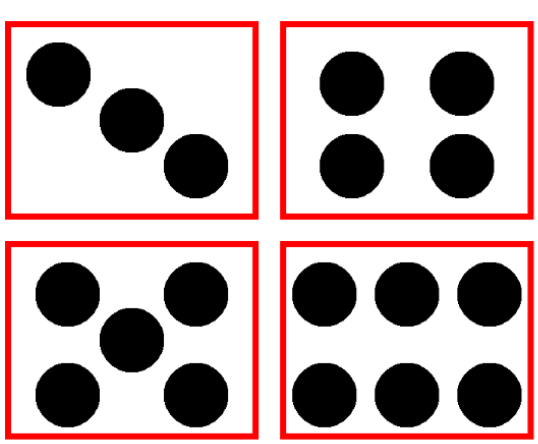
Digital Learning:

Resources

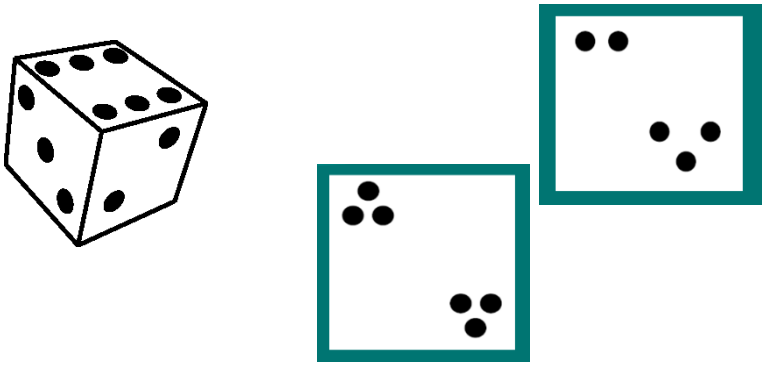
End of Level Benchmark

- *Identifies 'how many?' in regular dot patterns, for example, arrays, five frames, ten frames, dice and irregular dot patterns, without having to count*

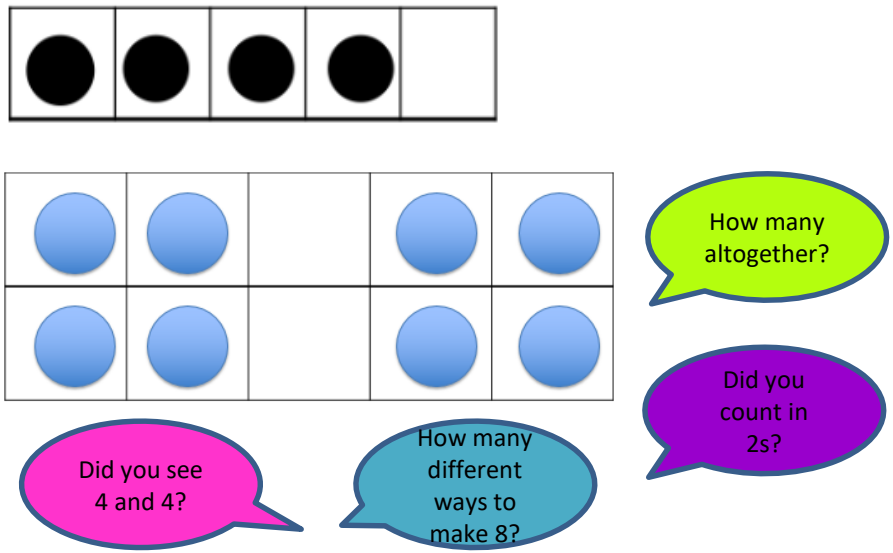
Domino Patterns



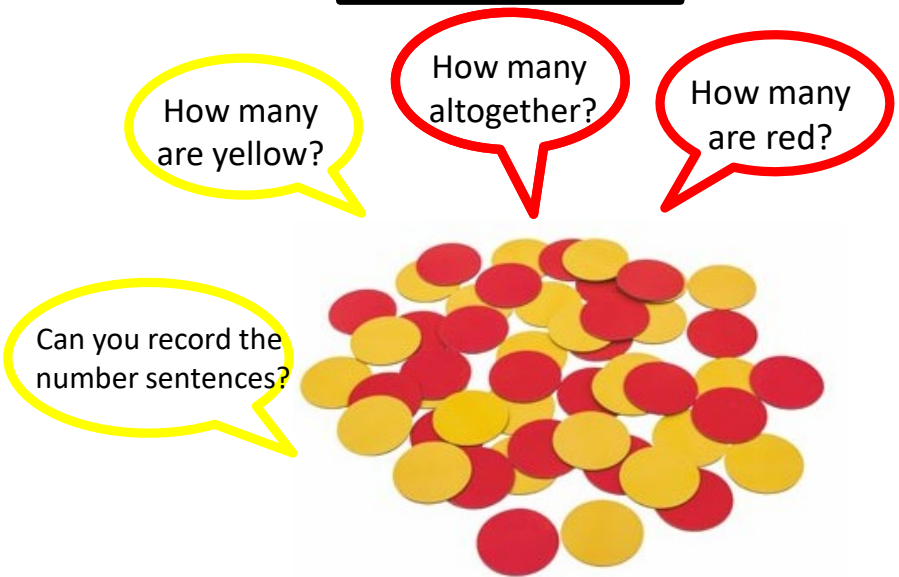
Subitising Cards- start with regular patterns, moving onto irregular patterns.



Using a five/ten frame to subitise

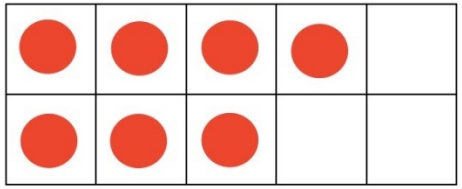


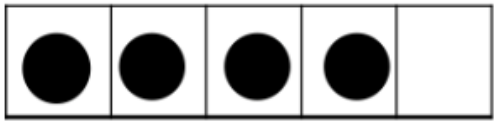
Randomly throw a selection of counters (starting with 5 and working up).



Resources – Subitising

Common Classroom Resources



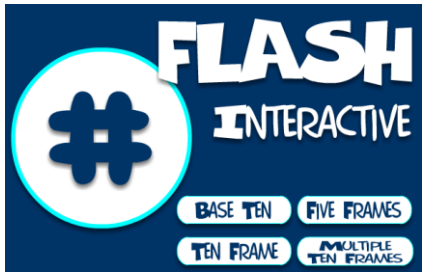


Use a Rekenrek – how many red/white…?

Our school resources:

(textbooks, HAM, Big Maths, worksheets, etc)

Online Resources



fast five

playdough numbers

Number sense activities

5 frame game

5 frame concentration

5 frame flash

https://nrich.maths.org/2477-

Scroll down to the activity at the end

Subitising Powerpoint

Counting : EL2

Mathematical Language : add, more, make, altogether, how many more?, how many left?, difference, take away, leave

CfE MNU 0-02a
MNU0-03a

Strategies and Approaches

- Counting activities should form part of daily math warm up activities.
- When counting objects, each object must be counted and assigned just one number name.
- The objects counted should be counted in a fixed order (1,2,3,4…). The order in which the objects are counted is irrelevant.
- Children need to be aware that the last number used gives the number of objects in that set (cardinality).
- The arrangement of the objects does not affect how many in the set (conservation of number). Some children may look at the two sets and say that set B contains more counters.

Set A:

Set B:

- Use counters, base ten materials, number lines and Numicon material and other concrete objects and manipulatives to support them whilst taking part in counting activities.
- Develop understanding of ordinal numbers – link to games played as part of physical education. Teach ordinal numbers to tell position in context of **space** and **time**. For example:-

'Second from the finishing line'

'Second in the race'

Digital Learning:

Resources

Questions to Enable Higher Order Thinking Skills

- Count how many counters,. If I add two/three… more, how many now?
- There are ten counters, I am going to hide three, how many now?
- If I have eight counters in this hand and three in the other hand, how many counters altogether?
- I have nine cubes, if I give three away, how many do I have left?
- Can you convince me that one more /less than 18 is 19/17?
- I shall clap where a missing number is: 8,9,10, clap, 12,13…What number did I miss?
- I'm thinking of a number, it is 3 more than 11. What number am I thinking of?
- I think four less than 16 is 12, am I correct? Can you use concrete materials to prove it?
- Put 5 objects of different colours in a row, with the yellow one in the middle. Ask children to count all the objects, starting with the yellow object as '1'.

Barriers to Learning

- Counting 1, 2, 3 then any number name or other name to represent many
- Number names not remembered in order
- Counting pattern not stable, counting names out of sequence
- Count does not stop appropriately
- Counts one item more than once or not at all
- Does not recognise final number of count as the cardinal value
- Thinks that because objects are spread out there are more
- Counting backwards is harder than counting forwards
- Bridging boundaries (e.g. tens and hundreds) can be very challenging

End of Level Benchmark

- *Uses one-to-one correspondence to count a given number of objects to 20.*
- *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'*
- *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.*

Counting on/back

Counting on/back- use actions, puppets and objects to illustrate counting rhymes and songs

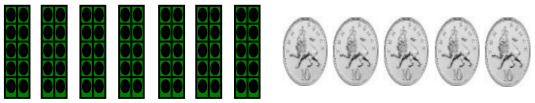
- How many claps, taps, barks, clicks…
- Counting on from various numbers
- Counting back from various numbers
- How many more to make 10, 15…?
- Can you clap five times and count aloud at the same time?

Skip Counting

Skip count in 2s

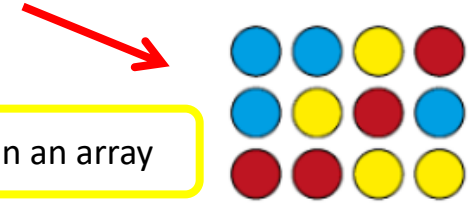
Skip count in 5s

Skip count in 10s



One to one correspondence

Set up in an array



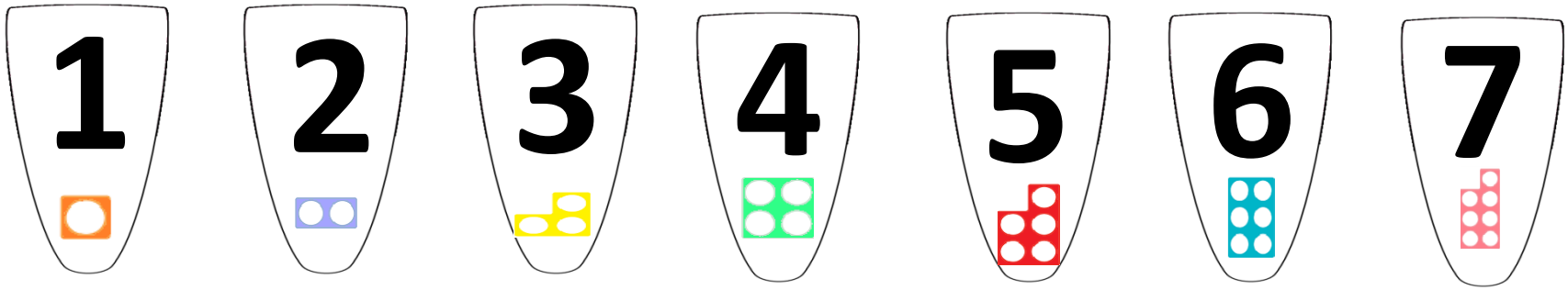
Irregular Patterns

Match to appropriate number/number name

six

Count how many counters there are and watch carefully as the child decides how many there are. Does he/she:

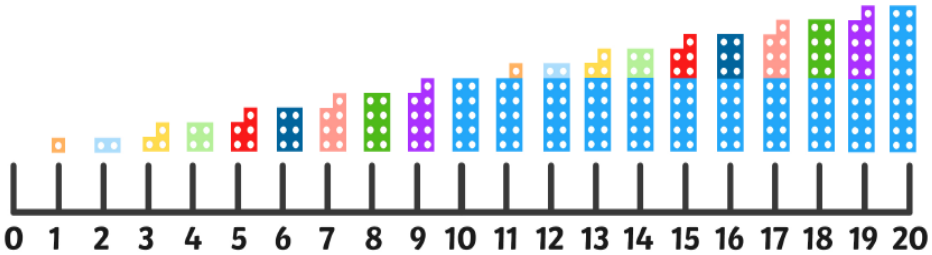
- Give an instantaneous response? Was it correct/incorrect?
  If correct, how did they work it out?
  If incorrect – more practise required.
  Can they explain how they worked it out?
  - Touch each object as they count?
  - Move each object as they count?
- Track the objects with their eyes whilst counting in their head?



Daily counting activities to include the use of number fans and/or number line.

Numicon Number Fans

Numicon Number Line



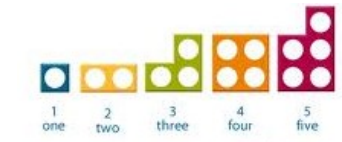
It can be difficult to explain to children the mathematical concept of 'five'. Using the Numicon shape for 'five' allows children to see that 'five' looks like 'one less' than six and 'one more' than four.

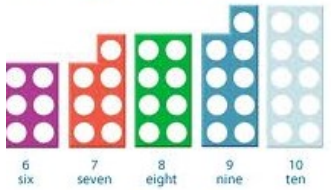
How many spaces in the green shape?

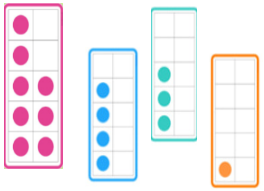
Can you count the blue shape in 2s?

Resources – Counting

Common Classroom Resources





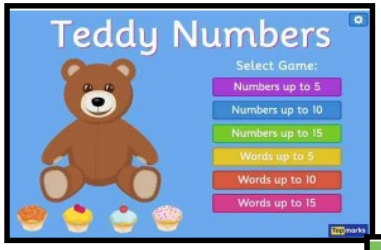


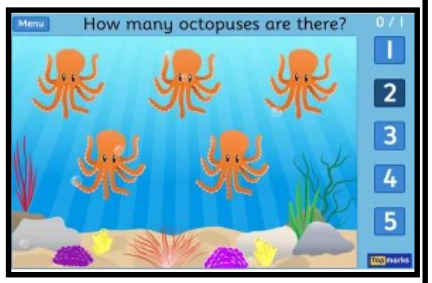
Set in arrays.

Our school resources:

(textbooks, HAM, Big Maths, worksheets, etc)

Online Resources





Nrich – Next Domino – allows children the opportunity to recognise ,describe and extend sequences as well as counting skills- https://nrich.maths.org/168/note

Variety of counting activities -

PDF

Counting Activities

Place Value : EL2

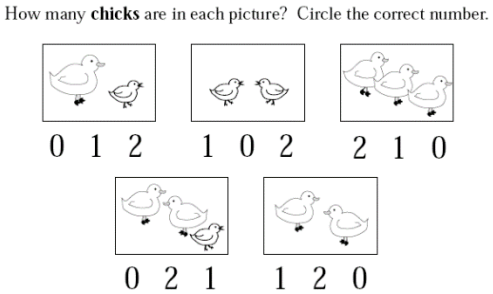
Mathematical Language : sets, seen, unseen, ten frame, altogether, partition, total, combine, part, whole, bonds, partition, bar model, zero, place holder

CfE MNU 0-02a
MNU0-03a

Strategies and Approaches

- Develop a strong sense of ten and allow lots of opportunities for children to partition numbers in many ways.
- Children should have a solid foundation of the 'fiveness of five' before moving onto partitioning within ten.
- Using five/ten frames are excellent resources for developing number sense within the context of ten.
- The concept of zero is usually harder than counting and other early number concepts. It should only be introduced after a child has understood the value of numbers to some extent. The difference between 0 and other numbers is that all of the other numbers have a tangible visual form, whereas 0 does not. Children should have experiences of :-

❖ Zero representing nothing to count
❖ Zero as a placeholder – the difference between 2 and 20 – 0 meaning no units
❖ The value of zero – "I had 5 oranges, then I ate the 5 oranges, now I have zero oranges...!"
❖ Additive Identity – adding 0 to 7 gives the answer 7



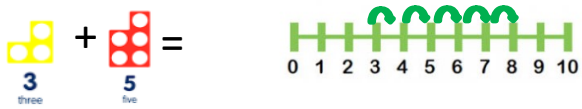
- Visually representing numbers up to at least ten and allowing children to use concrete materials to partition in different ways should develop conceptual understanding. Illustrating through the use of a bar model – part, part, whole is an ideal way to record the different representations.

Digital Learning:

Resources

Questions to Enable Higher Order Thinking Skills

- How many different ways can you represent 10?
- I have 8 animals and two paddocks (concrete resources should be used to represent animals and paddocks), I am looking for different ways to split the animals between the two paddocks. How many animals should I put in the first paddock? (put that number (e.g. 3) in the paddock and the remaining animals in the other paddock). How many animals are there in the second paddock? Check that the children's conservation of number skills allow them to understand that there are still 8 animals in total. Can we record this pictorially?



Can you find other ways to organise the animals between the two paddocks?

If I moved 4 pegs to the right side of the hanger, how many would remain on the left hand side?
How do you know?
If you know 4 + 6 = 10, what else do you know?

Barriers to Learning

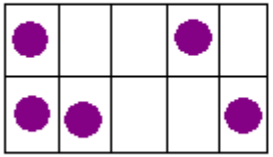
- Some children confuse the 'teen' and 'ty' numbers e.g. confusing 13 and 30, 19 and 90.
- Reversal of the tens and units figures when identifying larger numbers e.g. 17 becoming 71.
- Even if children are able to count with 2-digit numbers and can recognise and write some 2-digit numbers, they may struggle to comprehend the value of each digit in the number or that the value of each digit in a number is related to its position in the number.
- A sound understanding on the importance of zero as a placeholder needs to be firmly established.
- Language used by teacher when referring to a a set of ten as a 1 etc…

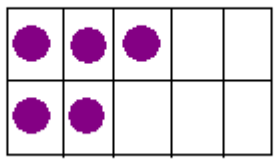
End of Level Benchmark

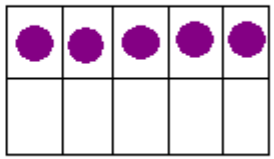
- *Explains that zero means there is none of a particular quantity and is represented by the numeral 0.*
- *Partitions quantities to 10 into two or more parts and recognises that this does not affect the total.*

Start with five frames and progress from there.

How many patterns can you see?

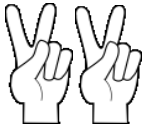






How many more to make 10?

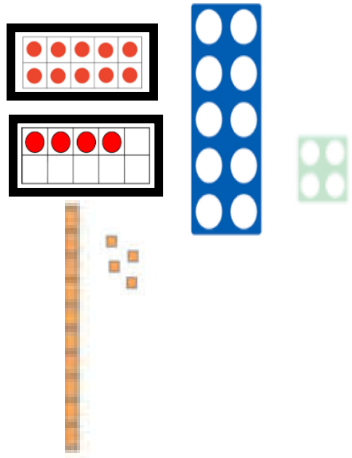
1, 1, 2 and 1 or
2, 2 and 1 or
3 and 2…



Number bonds can be explored using finger patterns, tens frames and double sided counters.

- *Show me 4. Show me a different 4, etc.*
- *Show me 6. How many more makes 10?*

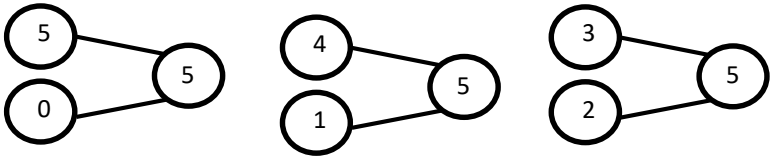
Partitioning 14 using tens frames, base ten material and numicon.



Using counters and demonstrating the results via a bar model.

Here are 5 double sided counters. Throw them onto the table. How many red? How many yellow?

Throw them again. How many different ways can they land?

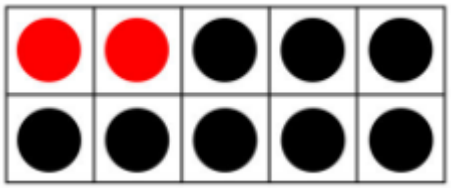


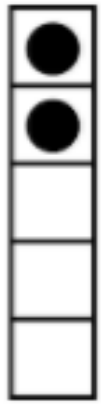
Place Value Dice

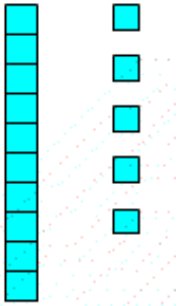
- What number have you rolled?
- Can you say the number?
- Can you write the number in words?
- Can you build it using place value cards?
- What about using some simple drinking straws in bundles of tens and ones?
- Can you order the numbers you have made?
- Which number is the smallest/largest.
- What is the difference between the first and second number you rolled?

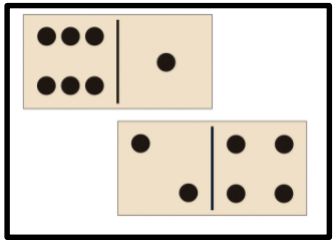
Resources – Place Value

Common Classroom Resources





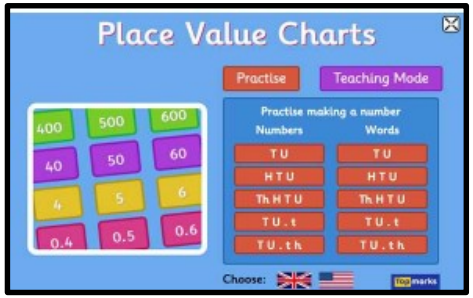




Our school resources:

(textbooks, HAM, Big Maths, worksheets, etc)

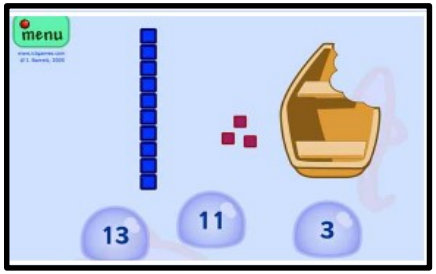
Online Resources

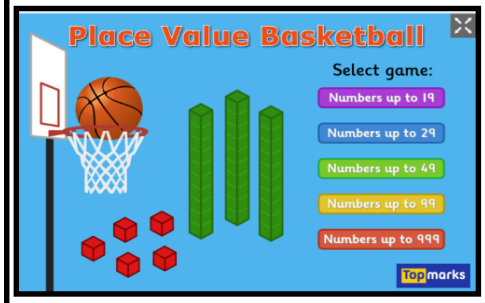


bear hide and seek

en missing part cards

Missing part cards





shake and spill

towers of 10

Nrich - Snail One Hundred – helps understanding of tens and units – https://nrich.maths.org/8303/note

Tes – Board Game-

Bonds to 10 game

Addition and Subtraction: EL2

Mathematical Language : add, more, make, altogether, total, how many more? How many left?, 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

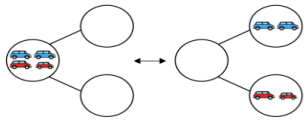
Strategies and Approaches

- It is important to teach children the different positions of the equal sign.

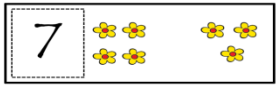
Sometimes the equals sign can go first – 10 = 7 + 3
Sometimes it goes in between two sums that the answers are the same- 10 + 8 = 15 + 3
Sometimes it goes just before the answer to a sum to show that the answer **is the same as** what you get when you have worked out the sum- 7 + 8 = 15

- Introduce the + and – sign in a meaningful context, using stories/language will help understanding
- Using a real life context and introducing the sums in a word problem can help. For example, translate a word problem into a number sentence and make up a word problem using a number sentence- I have 8 sweets and I give three away. How many sweets am I left with left? Can you use the counters to show me this problem? Can you write out the number sentence for this problem? If you know 8-3=5, what else do you know?
- Use five/ten frames/Numicon to develop conceptual understanding
- Visual representation through number lines and bar model
- Progression using the bar model approach
- Children should have lots of opportunities to explore how a whole can be split into parts and how these parts can be combined again to make the whole. Children will gain experience of identifying whole groups, for example, "I have four cars" and identifying parts, for example, "Two of my cars are red, and two are blue". (NCETM)

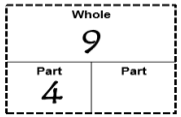
Can you represent this using a part, part, whole diagram?



Have one side of the card missing and allow the children (using concrete materials) to show/draw etc.. How many are missing to make 7.



Use concrete materials to find the missing part.



Questions to Enable Higher Order Thinking Skills

- Can you make up a word problem to demonstrate the number sentence 6 + 2 = ?
- Which number sentence matches with the following problem?

Tom has 5 stickers. His brother gives him 4 more stickers.
How many stickers does he have now?

4 + 5 = 9 9 – 5 = 4 5 + 4 = 9 9 – 4 = 5

- I have four strawberries. This picture shows my whole group of strawberries. How many different ways can you put the strawberries onto two plates?

- There were seven birds sitting on a tree and one flew away.
- Can you use counters to show this?
- Can you draw a picture to represent this?
- Can you write the number sentence to match this question? Can you think of a word problem for this question?

- What questions could you ask about this picture?
- Can you record any number sentences in connecti with this picture?

Barriers to Learning

- Children may still be developing skills in number recognition
- Skills in counting forwards/backwards not fully developed
- Language in word problems may be confusing and children may require support with understanding what is being asked of them.
- Seeing the equal sign as 'makes'

End of Level Benchmark

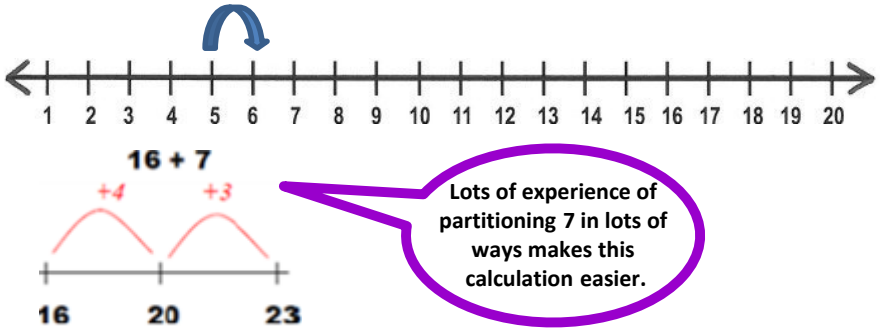
- *Uses appropriately the mathematical symbols +, – and =.*

Digital Learning:

Resources

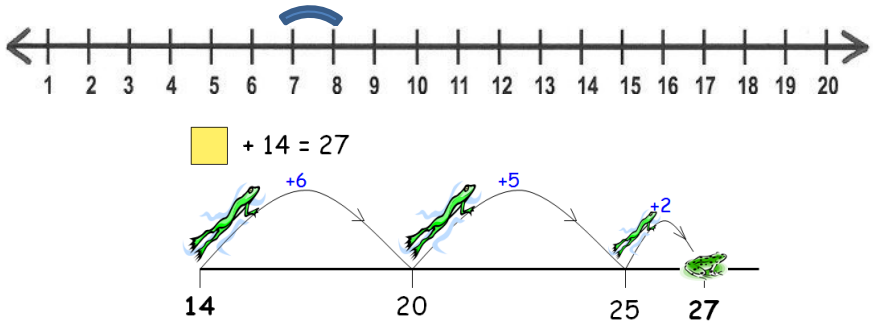
Number Lines to support finding one more/less, counting on/back

Visual representation of 5 pizzas and 1 more

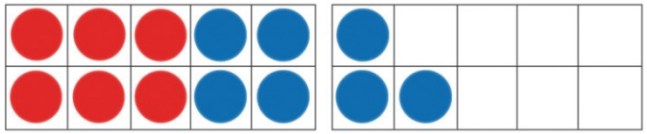


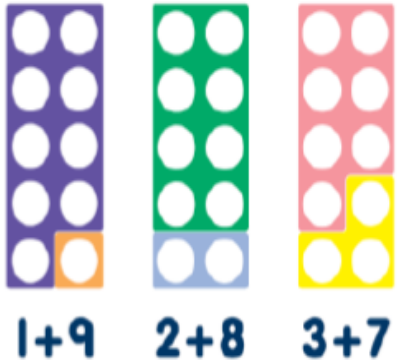
Lots of experience of partitioning 7 in lots of ways makes this calculation easier.

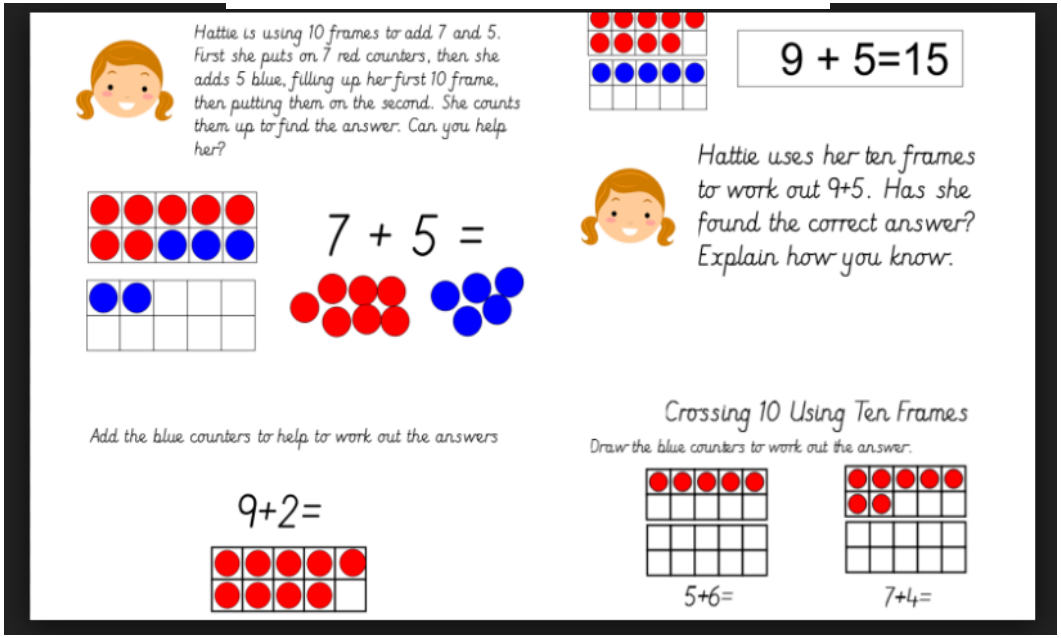
Visual representation of 8 eggs take away 1



6 + 7 = ?

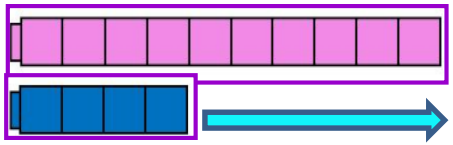






Rather than ask, What is the difference between 10 and 4?
Or 4 + ? = 10
Try asking,

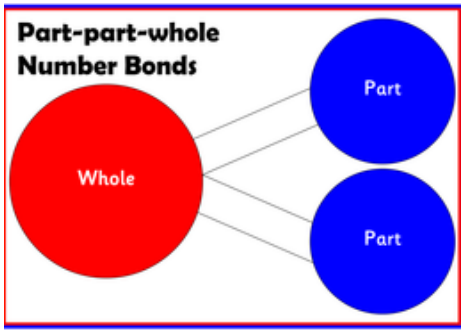
- What is the difference between these two towers?
- What does one have that the other doesn't?
- One tower has more blocks than the other – how many more?

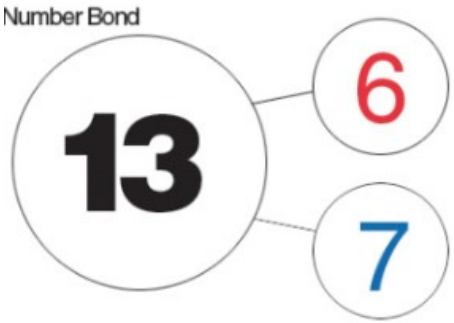


Bar Model- part, part, whole

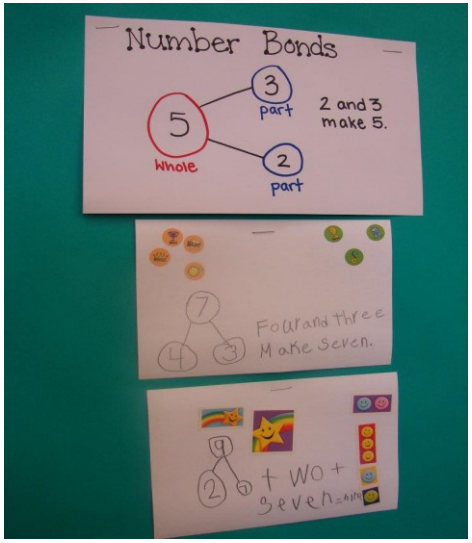
'Three friends won five marbles. How many different ways could they share them out?'

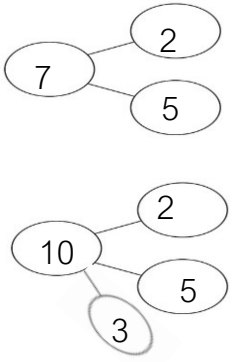
Show your answers on a part, part, whole diagram.

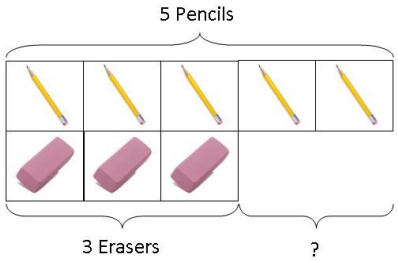




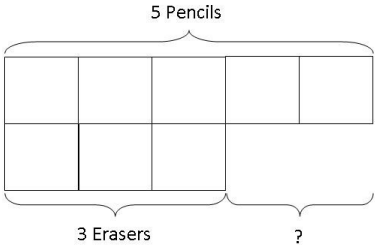
Can you record the number sentences?

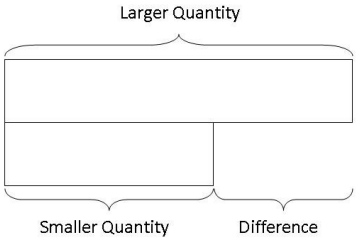




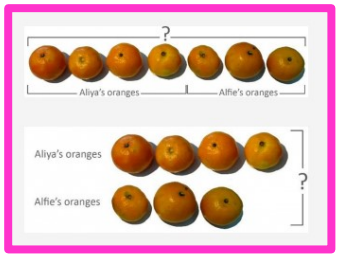


Peter has 5 pencils and 3 erasers. How many more pencils than erasers does he have?

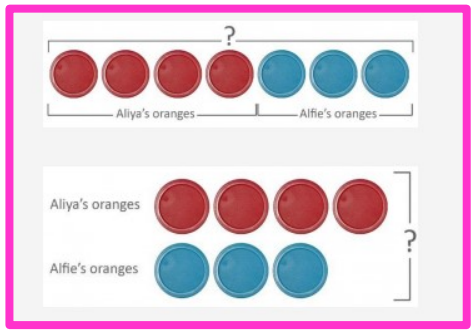




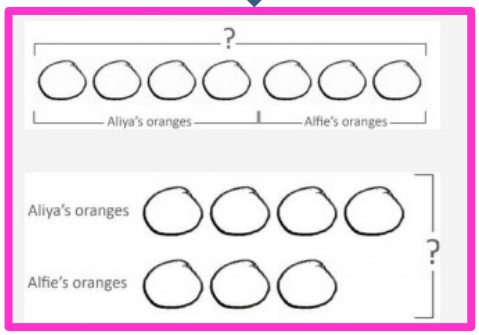
Aliya has 4 oranges. Alfie has 3 oranges.
How many oranges are there altogether?



Use the actual objects where possible.

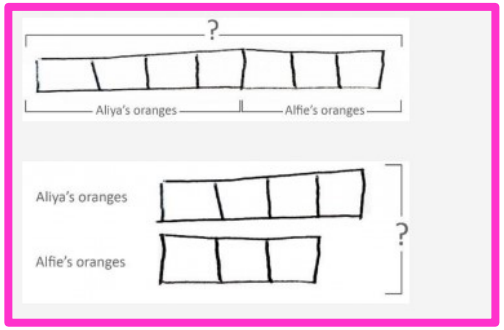


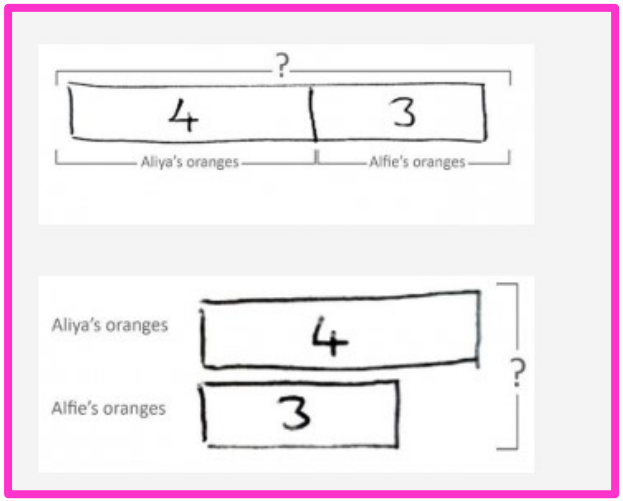
Replace the 'real' objects with objects that represent what is being discussed (in this case, we replace the 'real' oranges with counters).



Concrete to pictorial

Represent each object as part of a bar

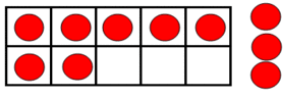




Each quantity is represented as a rectangular bar.

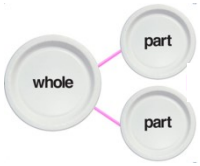
Resources – Addition and Subtraction

Common Classroom Resources

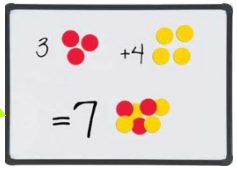


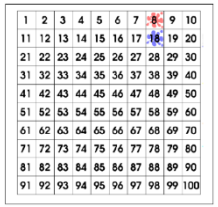
Numicon-
showing commutative law

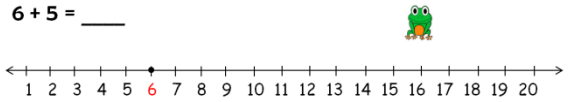
Adding/subtraction in groups of ten



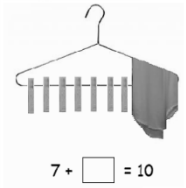
Using counters for part, part, whole or showing addition using concrete resources





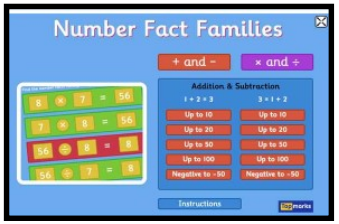


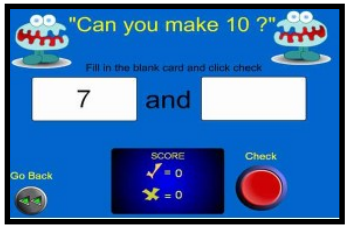
Adding/subtraction in groups of ten

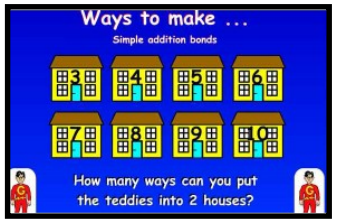


Our school resources:
(textbooks, HAM, Big Maths, worksheets, etc)

Online Resources







count on cup

questions in a context

Additiona and subtraction

Two out of three game

Number search sheets

addition bag

domino addition

Nrich Investigation – 2,4,6,8
https://nrich.maths.org/175/note

Nrich Investigation – One Big Triangle
https://nrich.maths.org/192/note

Multiplication and Division: EL2

Mathematical Language : Share(s), group(s), pairs, twos, threes, fours, etc. odd, even, array.

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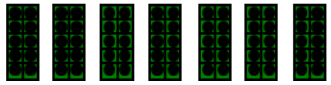
Strategies and Approaches

Skip counting

Skip count in 2s

Skip count in 5s

Skip count in 10s

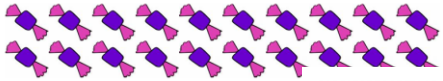


- Practical experience of finding doubles and halves (these concepts should be taught together)
- Using arrays
- Use Numicon to develop understanding of odds and evens and doubles
- Provide opportunities for pupils to share objects and group objects

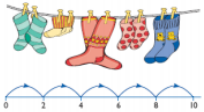
Questions to Enable Higher Order Thinking Skills

- How many groups of strawberries can you make?
- You have 20 sweets. How many sweets will each child have if you share equally between:-

2 children
5 children
10 children



- There are 5 pairs of socks in the washing pile. How many socks altogether?



- Ten stickers are shared between two children; how many will they have each?
- If we have ten children, how many pairs can we make?

Barriers to Learning

- Some pupils may still count in ones to find how many there are in a collection of equal groups; lacking understanding in associated vocabulary, 'groups of', 'share equally…'
- Pupil does not link counting up in equal steps to the operation of multiplication; does not use the vocabulary associated with multiplication.
- Pupil does not focus on 'rows of' or 'columns of', but only sees an array as a collection of ones
- Pupil does not use knowledge of doubles to find half of a number; for example, continues to find half by sharing using a 'one for you' approach and cannot apply knowledge of doubles.
- Not efficient at counting on in twos, fives and tens
- Unable to use grouping to solve division problems
- Unable to describe arrays and write appropriate number sentences about what they see

Digital Learning:

Resources

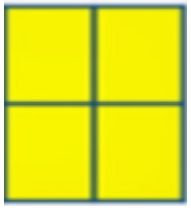
End of Level Benchmark

- *Doubles numbers to a total of 10 mentally*

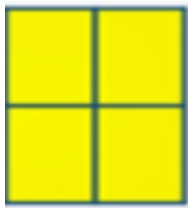
Arrays

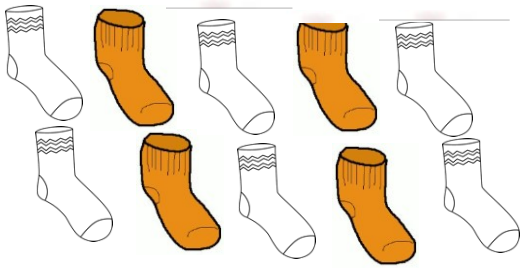
When teaching doubles – set objects in an array

To multiply using repeated addition – setting out in arrays.



2 groups of 4 –
Double 4
Repeated addition 2 + 2+ 2+ 2





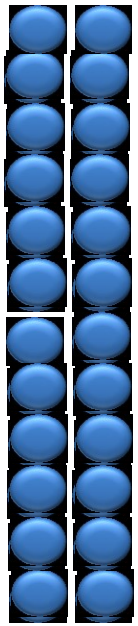
Solving problems involving doubles.

I have 2 bags. There are 5 pennies in each bag. How many pennies do I have altogether?

Rather than count the pennies individually, let's count in 2s.

Bag 1	Bag 2	
●	●	2
●	●	4
●	●	6
●	●	8
●	●	10

Leading to…



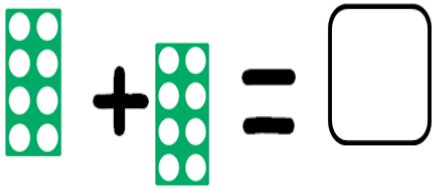
2x1 = 2
2x2 = 4
2x3 = 6
2x4 = 8
2x5 = 10
2x6 = 12
2x7 = 14
2x8 = 16
2x9 = 18
2x10 = 20
2x11 = 22
2x12 = 24

Numicon

Double 2 is _____

Double 4 is _____

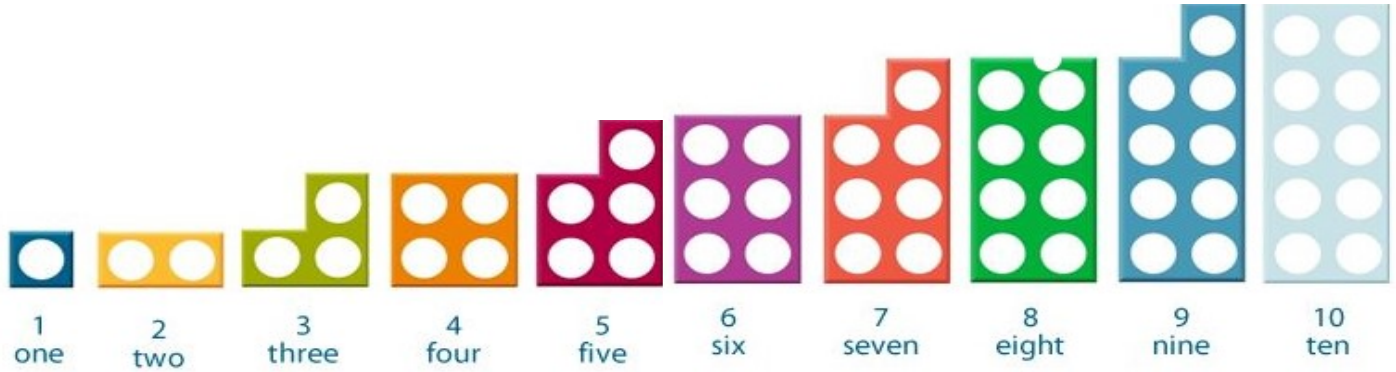
Double 8 is _____



Odd and Even Numbers

Which numbers have no partners?

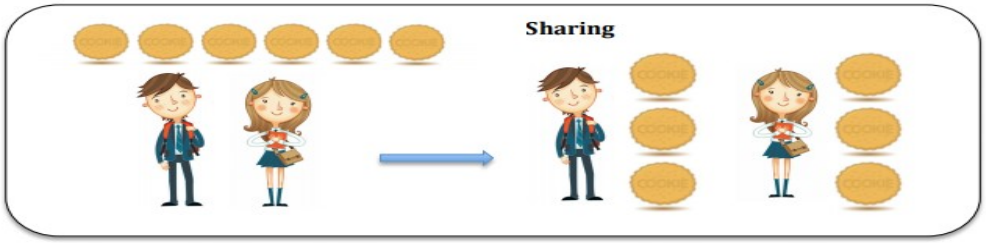
Can you sort them into two groups?



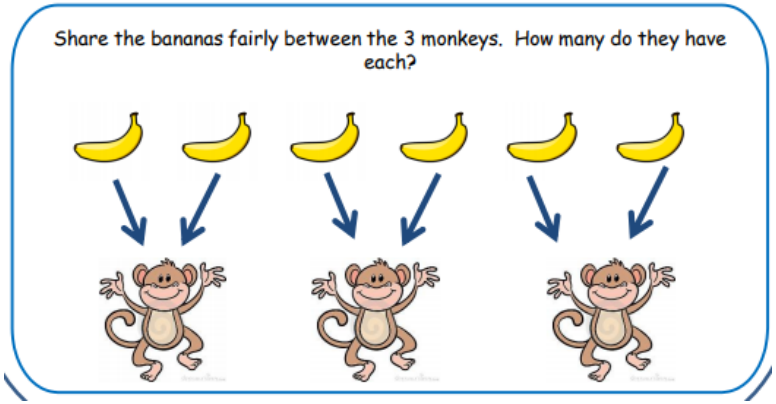
Share 6 cookies equally between 2 children.

Sharing

In this scenario, using concrete objects, the biscuits are shared out one by one until there is none remaining. The result is that the children receive 3 cookies each.



Children are encouraged to draw pictures and represent their mathematical thinking through various representations.



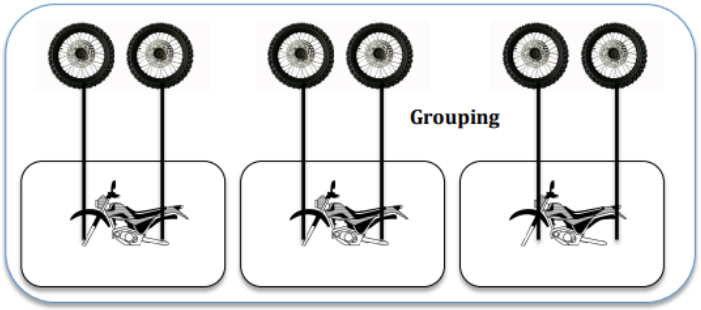
How many motorbikes can be made with 6 wheels?

This scenario, using concrete objects, involves repeated subtraction or grouping.

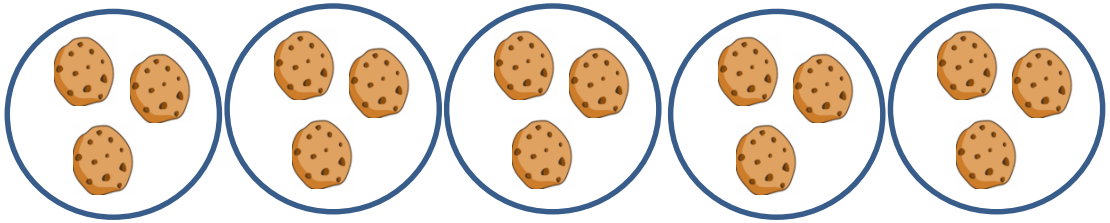
Each time 2 wheels are moved and fitted to one motorbike.

The result is 3 motorbikes can be made.

Grouping



Sharing & Grouping



Division

Using objects, diagrams and pictorial representations to solve problems involving **both** grouping and sharing.

How many groups of 4 can be made with 12 stars? = 3

Grouping:

Sharing:

4 4 4

12 shared between 3 is 4

Example division problem in a familiar context:
There are 6 children on this table and there are 18 pieces of fruit to share between us. If we share them equally, how many will we get each?

Can they work it out and give a division statement?

'18 shared between 6 children gives us 3 each.'

Children should:

- Use lots of practical apparatus, arrays and pictorial representations.
- Be taught to understand the difference between 'grouping' objects (How many groups of 2 can you make?) and 'sharing' (Share these sweets between 2 people.).
- Be able to count in multiples of 2s, 5s and 10s.
- Find **half** of a group of objects by sharing them into two equal groups.

Sharing

"15 biscuits are to be shared between 5 people. How many will they each get?"

Grouping

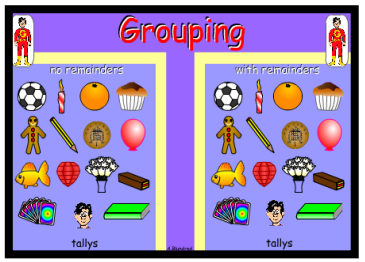
"15 biscuits are to be put into 3 packets. How many will there be in each packet?"

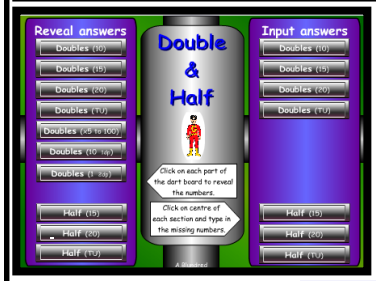
Resources – Multiplication and Division

Common Classroom Resources

Our school resources:
(textbooks, HAM, Big Maths, worksheets, etc)

Online Resources





Nrich Investigation – Magic Plant
https://nrich.maths.org/145/note

Multiplication – variety of websites

Multiplication Websites

Fractions, Decimals and % : EL2

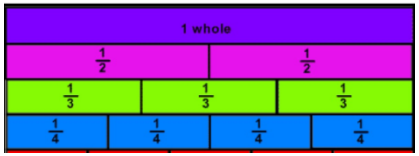
Mathematical Language : Half, quarter, share, equally, part, part, whole, amount, shape, object, number, one half, one quarter

CfE MNU 0-02a
MNU0-03a

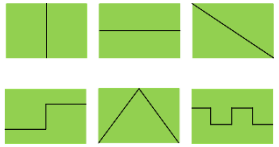
Strategies and Approaches

- Pupils should have opportunities to halve and quarter shapes, objects and quantities into two equal parts.
- Opportunities for pupils to recognise and identify halves and quarters and establish links between halves and quarters.
- Cutting and folding activities.
- Opportunities to put shapes back together to see the 'whole' shape.
- Provide classroom shapes, card , paper and objects to allow pupils a range of experiences to explore in different ways.
- Find a quarter by halving and halving again

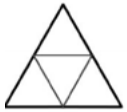
- Using a section of a fraction wall will allow pupils to 'see' what a half and a quarter looks like (early introduction of equivalence)



Questions to Enable Higher Order Thinking Skills



What fraction have these shapes been spilt into?
How do you know?
Can you prove it?



Can you shade half?
Can you shade one quarter, two quarters…
Do you notice anything between one half and two quarters?

Tim has 6 marbles. He lost half of them. How many does Tim have left?

How many ways can these counters be shared?

Barriers to Learning

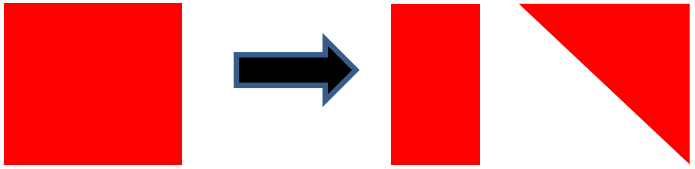
- Children do not have a sound understanding of grouping and sharing
- Children need to explore many representations and uses over a period of time; sometimes their experiences are limited to pizzas. Open up opportunities for pupils to find fractions of objects, shapes and amounts in equal measures.
- Pupils are unsure how to share equally

Digital Learning:

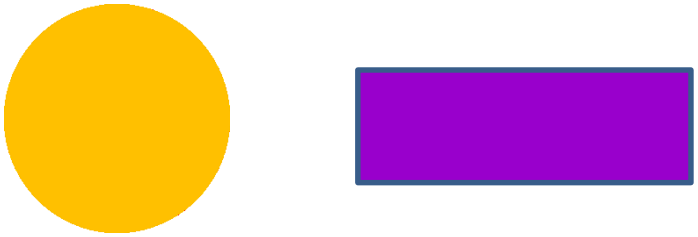
Resources

End of Level Benchmark

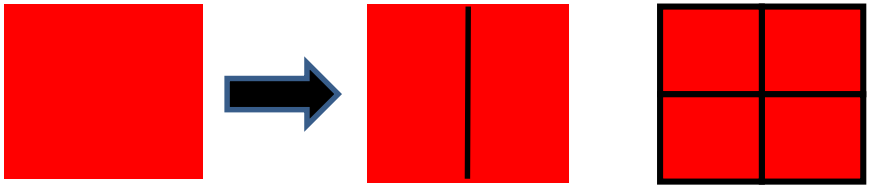
- *Splits a whole into smaller parts and explains that equal parts are the same size.*
- *Uses appropriate vocabulary to describe halves.*



Folding and cutting activities to allow children to see that the shape can be halved in different ways; creating different shapes, but the size stays the same.

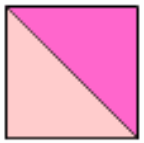


How many different ways can you cut/fold these shapes to make two or four equal parts?

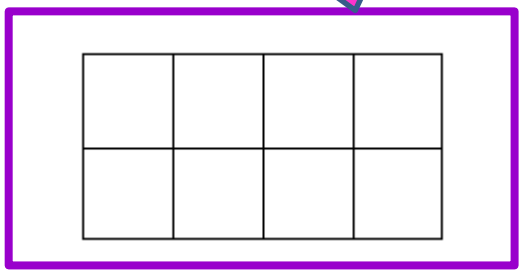


Learning about quarters by halving and halving again

Show me one quarter of this shape in as many ways as you can think of.



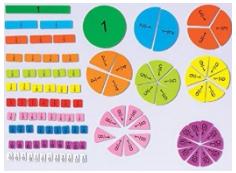
Extending to other shapes/objects.



Resources – Fractions, Decimals and %

Common Classroom Resources

A variety of shapes
to halve and quarter.



Fraction tiles or magnets

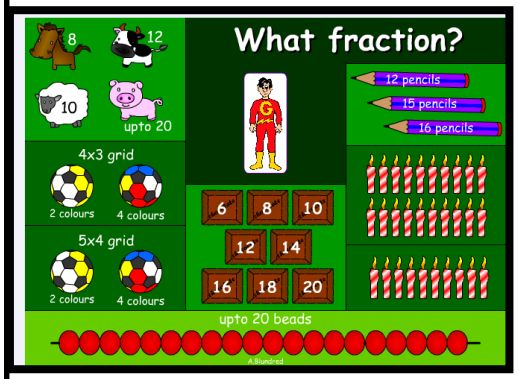
Abacus –
"Can you show me
half of ten?"

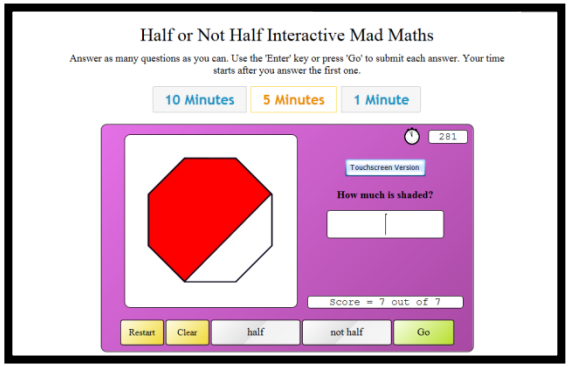
Squared and coloured paper

Blocks – place 4 blocks to make a rectangle-
"Can you split these into halves/quarters?"

Our school resources:
(textbooks, HAM, Big Maths, worksheets, etc)

Online Resources





Nrich Fractions Investigation:- Happy Halving
https://nrich.maths.org/217/note

Nrich Fractions Investigation: - Halving
https://nrich.maths.org/1788/note

Nrich Fractions Investigation:- Paper Halving
https://nrich.maths.org/13059

Money : EL2

Mathematical Language : buy, cost, sell, change, spend, spent, amount, value, same, not the same, coin, note, card, price, more, less, least, most, altogether, sale, how much, cheaper, dearer, between, left, pound, pence, penny, pennies, purse

CfE MNU 0-09a

Strategies and Approaches

Children should be exposed to situations when we use money in everyday lives (wants and needs). In play situations, using records, receipts, order forms as a stimulus for money activities e.g. post office, cinema tickets, travel agents, shops, banks, ticket centre etc.. In real life contexts – shopping trip, visit to local bank, post office. Children should be given time to 'handle' coins and associate the coins with the value.

- Talk about money in a range of contexts
- Use coins (real money, where possible) to pay for amounts in play and real life contexts
- Identify what is the same and what is different about notes and coins
- Sort notes and coins that have the same value
- Order money according to the value
- Compare prices and identify the cheaper and dearer item
- Understand that I will get change if I give too much money
- Add amounts together to make a total cost
- Take away an amount to make a price cheaper

Digital Learning:

Resources

Questions to Enable Higher Order Thinking Skills

- Can you tell me what coin this is?
- Which coin has the highest value?
- Can you show me/draw the coins you could use to make 10p? Can you show me another way?
- Why do you learn about money?
- How much would it cost to buy the… and the … altogether?
- Let's go shopping to buy an apple – it costs 15p – which coins do I need? If I had 20p, what would my change be?
- Can you sort these coins from highest to lowest value?
- List as many ways as you can to work out the change from … if you spend…
- Explain how you know that 5 x 2p is the same as 10 x 1p or 1 x 10p. Can you draw a picture to prove it?
- If you know that 7p + 5p = 12p, what else do you know?
- I have eight pennies in my purse, I spend 5p, how much money will be left?
- I have 5 coins in my pocket between 1p and 10p– what could they be? Can you find another way?

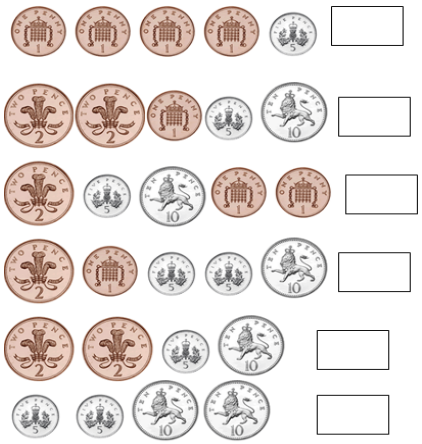
Barriers to Learning

- Paying for items with money can be an unknown for some children; lots of people now use credit cards, internet banking and online shopping. This can lead to children seeing money as an abstract concept.
- Some pupils may think that the larger the size of the coin, the greater the value of the coin, for example, a 2p coin is greater in value than a 5p coin.
- Some pupils may think that all coins are circular.

End of Level Benchmark

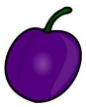
- *Identifies all coins up to at least £2.*
- *Applies number skills (addition and subtraction) and uses at least the 1p, 2p, 5p and 10p coins to pay the exact value for items costing up to at least £1.*

Count each row of money and put the amount in the empty box



Can you order the totals from the least to the most amount?

How much altogether for the … and the …?

	1p		8p
	6p		9p
	3p		4p
	7p		2p
	5p		10p

True or False: these coins equal 10p

True or False: The answer is 5p

What can I buy using these coins?

This sharpener costs 8p. I think I can pay for it using these coins –

Am I correct?

Are there other coins to total 8p?

If I bought the grapes, how much change would I get?

Resources – Money

Common Classroom Resources

Our school resources:

(textbooks, HAM, Big Maths, worksheets, etc)

Online Resources

Recognising and adding coins-

Money, Money, Money

Nrich Money Investigation – The Puzzling Sweet Shop – https://nrich.maths.org/223

Time : EL2

Mathematical Language : Days of the week: Monday, Tuesday…, months of the year: January, February…, seasons: spring summer…,morning, afternoon, evening, night, light, dark, today, yesterday, tomorrow, o'clock, soon, early, late, hands, before, after, how long…? Always, often, never, sometimes, timer, calendar

CfE MNU 0-10a

Strategies and Approaches

Before introducing a clock face, start with the general concept of time- morning, afternoon, evening... Discuss with the children activities that happen at certain times of the day e.g. "We eat breakfast in the morning" and "We go to sleep at night".

- Classroom essentials- to develop an awareness of time ,children should be exposed to regular opportunities to 'see' time around them. Each class should have a calendar on display showing days of the week, months of the year and associated seasons and weather symbols. Use daily opportunities (whilst developing essential language), to ask questions – 'What day was it yesterday?', What comes after…?'
- What can you do in a minute activities.
- Everyday language of time – use of sand timers, songs etc. to mark the passage of time. Use language such as before, next, soon, later etc. in everyday contexts
- Daily routines – "What do we do before/after lunch"? Sequence daily activities in order.
- Days and months- displayed prominently, able to sequence, encourage before/after
- Seasons- allow children to observe the changes in weather. Experiment with seasonal activities to allow for explorations of the senses, for example, the crunching of the leaves/snow, the sound of pouring rain…
- Tell the time on the hour – use small clocks to set/read time. Incorporate fun games/activities to aid understanding. When teaching how to tell the time on the hour, first make sure that children really understand that a clock face is just a special kind of number line. Using clocks as a circular number line to count on and back in whole hours to find out how many hours later and earlier something is.
- Use story/picture books to enhance teaching and learning.

Digital Learning:

Resources

Questions to Enable Higher Order Thinking Skills

- Show me a month in the summer. And another, and another.
- Convince me that there are seven days in a week
- Always / Sometimes / Never: -You get dressed before you go to school, You have lunch at 12 o'clock
- Can you tell me the time in another way?
- What if I changed the hour hand – what time would it be then?
- What is the purpose of learning about time?
- What would happen if you could not tell the time?
- Bart leaves for football at 10 o'clock. It takes him one hour to get there. What time does he get there? Draw the time on the clock.
- Mary goes shopping. She goes on the bus which takes one hour. If she sets off at 11 o'clock, what time does she get there?

Barriers to Learning

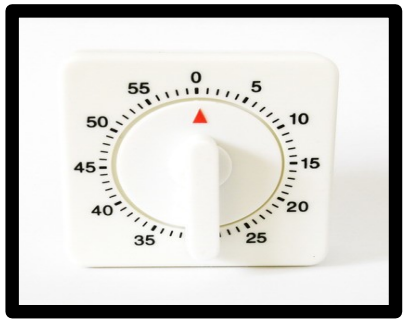
- Pupils have difficulty establishing an awareness of time and can receive conflicting messages regarding the passing of time. For example, "I'll be with you in a minute", "Give me a second… "
- Some pupils may find sequencing their day difficult if they have no established routines
- Misunderstanding of vocabulary - yesterday, today, and tomorrow are only understandable when they are linked to a specific event or activity that makes the concept of time concrete
- Some pupils may think that the hour hand is the long hand as it is more important
- Some pupils may think that every month is of equal length
- Some pupils may read a clock face in an anti-clockwise direction
- Some pupils may think that there are ten months in a year
- The circular clock itself can be confusing for some children and this may need to be 'opened' up.

End of Level Benchmark

- *Links daily routines and personal events to time sequences*
- *Names the days of the week in sequence, knows the months of the year and talks about features of the four seasons in relevant contexts.*
- *Recognises, talks about and where appropriate, engages with everyday devices used to measure or display time, including clocks, calendars, sand timers and visual timetables.*
- *Reads analogue and digital o'clock times (12 hour only) and represents this on a digital display or clock face.*

One minute sand timer

Watching the second hand on a clock



Using a kitchen timer

Using a stopwatch

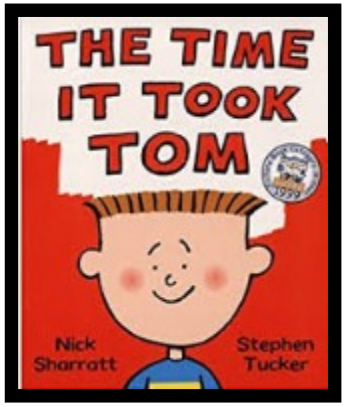
Using the timer or stopwatch on a phone

Using an online timer

Lots of different opportunities to ‘see’ time in real life contexts.

Can you order the days of the week/months of the year?

What can you tell me about Spring?



This is a brilliant book for talking about how long different things take (seconds, ,minutes, hours, days etc); building up an awareness of time.

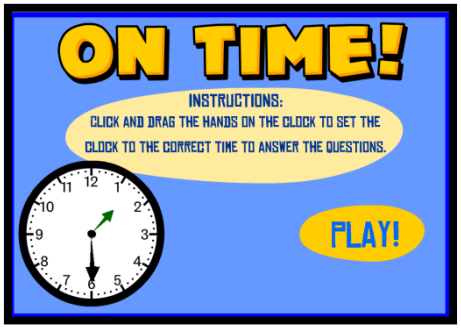
A number line pointing to the number three to represent 3 o' clock.
This can be progressed onto :- 'What time will it be in two hours time?'
'What time is one hour earlier than 3 o'clock?'
Allow opportunities to do this from various starting points.

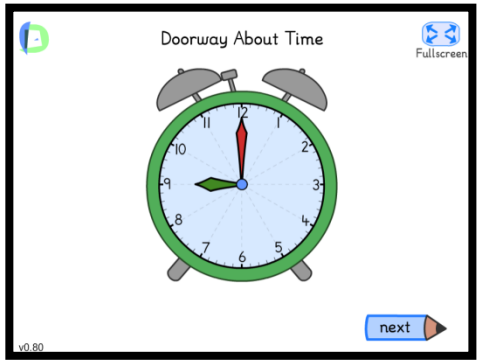
Resources – Time

Common Classroom Resources

Our school resources:
(textbooks, HAM, Big Maths, worksheets, etc)

Online Resources





Nrich Time Investigation – Snap
https://nrich.maths.org/6082/note

Nrich – Time Investigation – Times of Day
https://nrich.maths.org/6609/note

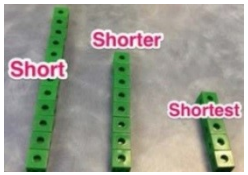
Measurement : Length, Mass & Capacity EL2

Mathematical Language : Long, short, longer, shorter, longest, shortest, tall,/taller/tallest ,double, half, heavy, light, heavier, lighter, heaviest, lightest, full, empty, more than, less than, half full, half empty, nearly full, nearly empty, almost

CfE MNU 0-11a

Strategies and Approaches

Lots of opportunities for children to compare the length, mass and capacity of different objects by placing objects side by side, holding to determine which is heavier and/or pouring to determine which holds more.



Through play based activities, introduce associated , everyday language such as longer, shorter, heavier…. and use this language to describe objects.

Estimate how many cubes long objects are- using paperclips, cubes, lolly pop sticks …Using Cuisenaire rods can help children 'see' different lengths and make comparisons.

In order to become familiar with standard measures, pupils begin to use measuring tools such as a ruler, weighing scales and containers.

Put 6 cubes in one side of a balancing scale- how many do I need to put in the other side for it to balance?

Show an empty container – ask what the children can see. Repeat with a full container. Which one has the biggest capacity?

Digital Learning:

Resources

Questions to Enable Higher Order Thinking Skills

- Show me an item longer than this ruler. And another, and another …
- Show me an item heavier than this book. And another, and another
- What size of puddle do you think this this liquid would make? Would this amount make a bigger or smaller puddle? What makes you think that?
- Can you order these from … to …?
- Can you find things which are longer than…?
- Can you find things which are shorter than…?
- Choose 3 different coloured crayons and put them in order from longest to shortest. Do you agree/disagree with the way your partner has ordered them? Why/why not?
- How many cubes long is your foot? Compare to your partners' foot. Whose foot is longer?
- Which line is the longest? How do you know? Can you prove it?

Barriers to Learning

- Some of the language may be problematic for some children; lessons need to be modelled and visual
- Poor fine motor skill development may result in 'hands on' practical tasks being difficult for some pupils

End of Level Benchmark

- *Shares relevant experiences in which measurement of lengths, heights, mass and capacities are used, for example, in baking*
- *Describes common objects using appropriate measurement language, including tall, heavy and empty*
- *Compares and describes lengths, heights, mass and capacities using everyday language, including longer, shorter, heavier, lighter, more and less.*
- *Estimates, then measures, the length, height, mass and capacity of familiar objects using a range of appropriate non-standard units.*

Cuisenaire Rods

Which is longer a line of three red rods or one yellow rod?

How many orange rods do you need to balance the mass of five pencils?

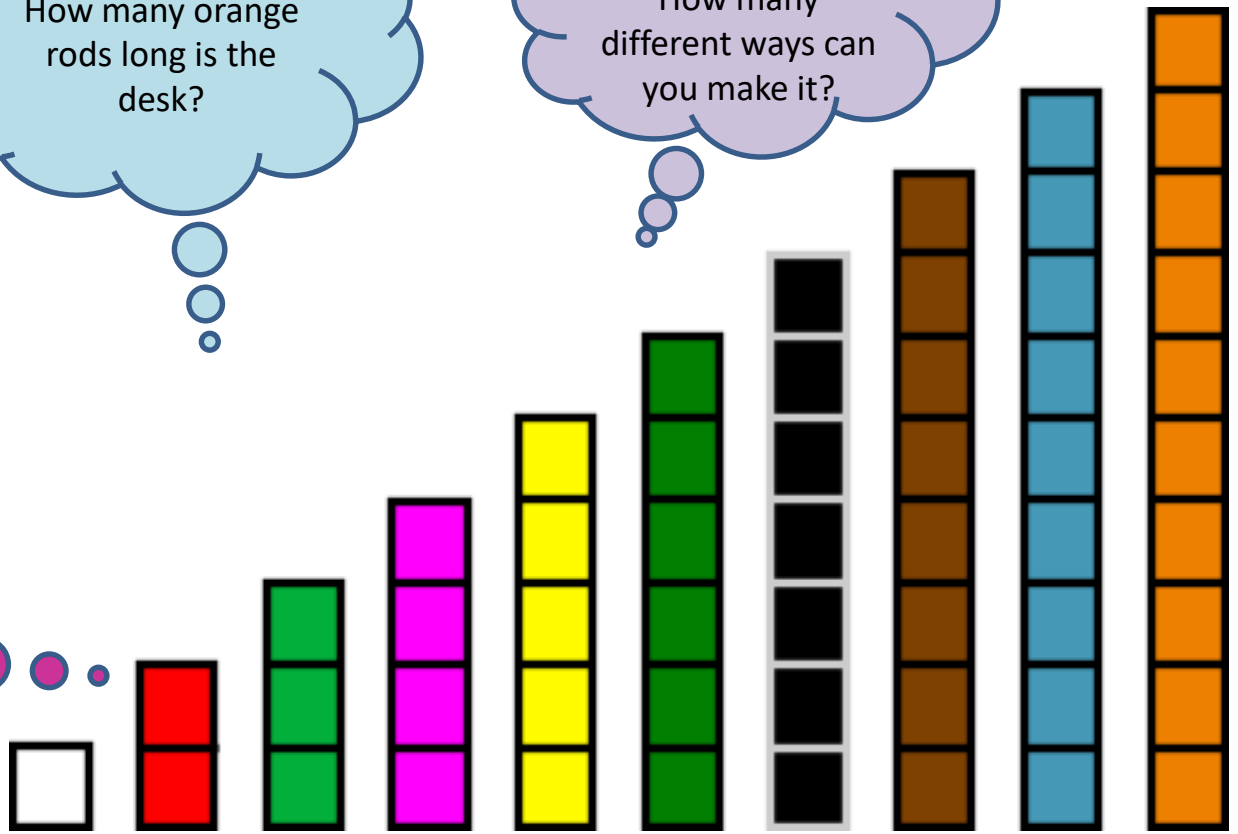
How many white cubes would it take to cover the yellow rod?

How many orange rods long is the desk?

Can you make a train of 8 rods? How many different ways can you make it?

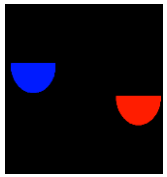
Find an object the same length as the black rod.

Which is longer – one orange or two blues? Estimate first then measure.

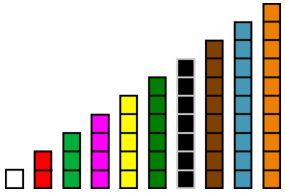


Resources – Measurement

Common Classroom Resources

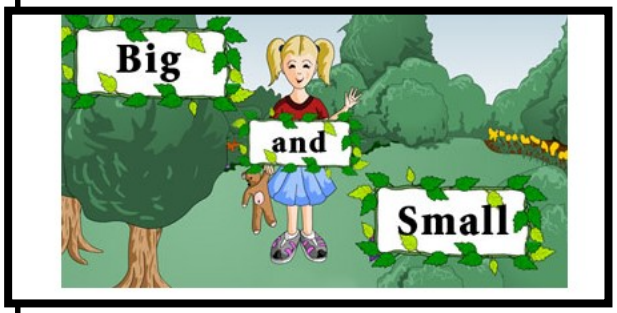



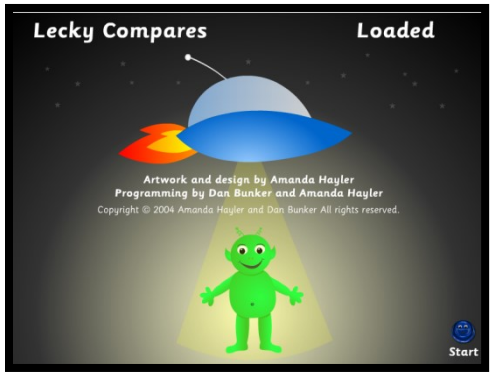



Our school resources:
(textbooks, HAM, Big Maths, worksheets, etc)

Online Resources





Nrich : Same length Trains
https://nrich.maths.org/4332

Nrich – Little Man (Capacity- estimating quantities)-
https://nrich.maths.org/4789/note

Patterns and Relationships : EL2

Mathematical Language : Pattern, repeat, continue, describe, same, different, predict, next to, first, second, third...

CfE MNU 0-13a

Strategies and Approaches

Talk about, recognise, continue and recreate simple patterns using everyday language

Use common classroom shapes and objects, dominoes for example, to describe/continue simple patterns and relationships

Use an example of a number sequence forwards and backwards that the children have been practising, e.g. counting in twos, counting in fives or tens to look for repeating patterns/missing numbers (linking with work on numerals)

Use Numicon number lines as a visual aid to finding missing numbers.

If children struggle with patterns and relationships, maybe using music, language, and physical activity to promote the repetitive and rhythmic patterns will help.

Digital Learning:

Resources

Questions to Enable Higher Order Thinking Skills

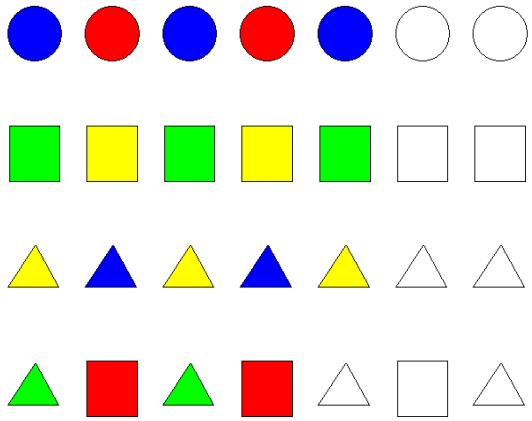
- Can you think of times where you have noticed a number pattern?
- Use ordinal language to describe which object is first, second, third, etc.
- What number pattern do you see? (going up in 2s, odd numbers, skip counting in 10s...)
- Can you spot the mistake - 10, 20, 30, 50, 40, 60, 70.
- Teddy is seven year old today, Teddy has seven presents today. Each year he is given the same number of presents as his age. How many presents has he had since he was born? How many presents has Teddy got today? How do you know? How many presents would he have got last year if he got the same number as his age? How many will he have next year? How many would he have had two years ago? How do you know? Can you use cubes to help you?

Barriers to Learning

Ensure pupil understanding of the importance of ensuring that = does not signify a calculating instruction ('makes') but does mean 'equivalent to'. The idea of both sides of an equation being worth the same is a fundamental concept but many children don't realise that 4 + 5 = 9 can be written:
4 + 5 = 6 + 3, 4 + 5 = 7 + 2, 4 + 5 = 11 - 2.

End of Level Benchmark

- *Copies, continues and creates simple patterns involving objects, shapes and numbers*
- *Explores, recognises and continues simple number patterns*
- *Finds missing numbers on a number line within the range 0 - 20*



Can you spot the pattern?

Can you continue the pattern?

Can you make a pattern of your own?

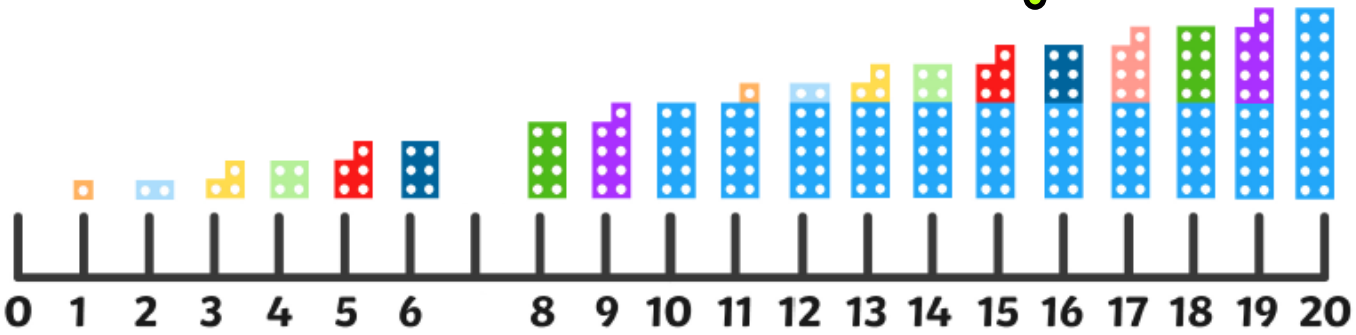
Use known number facts before progressing onto more difficult missing number activities.

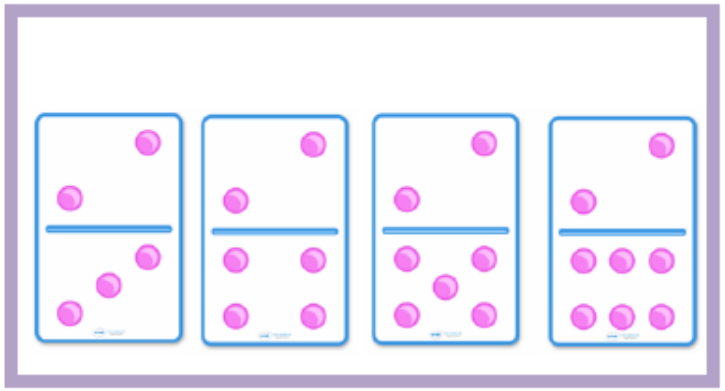
2	4	6	8						
5		15		25					
10		30		50					

What is the missing number?

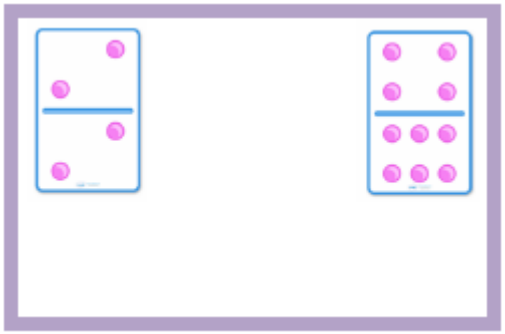
How do you know?

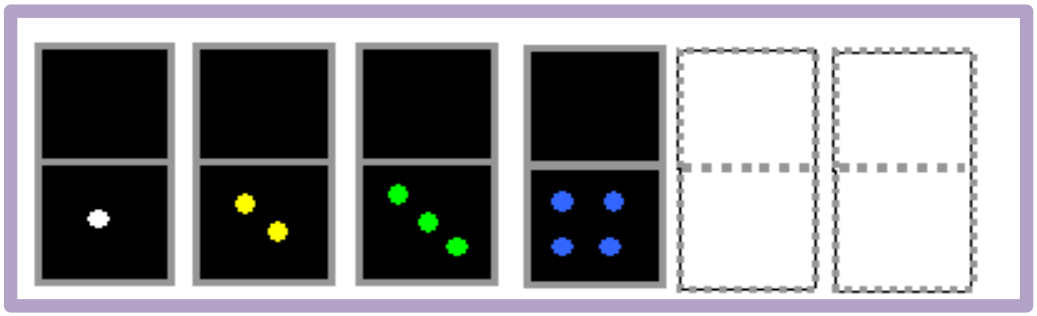
Can you prove it?



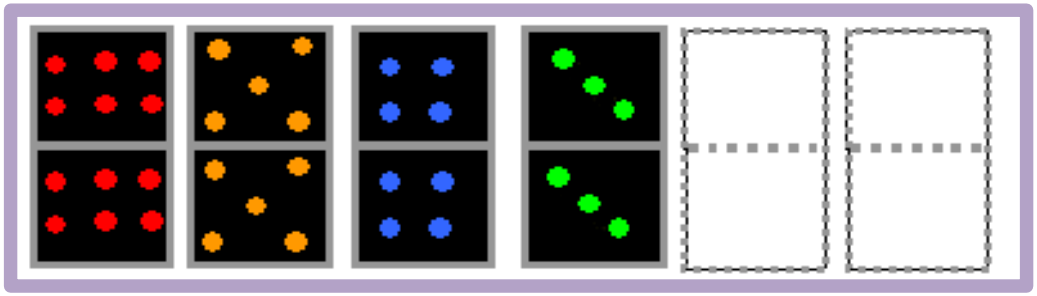


What's the pattern?

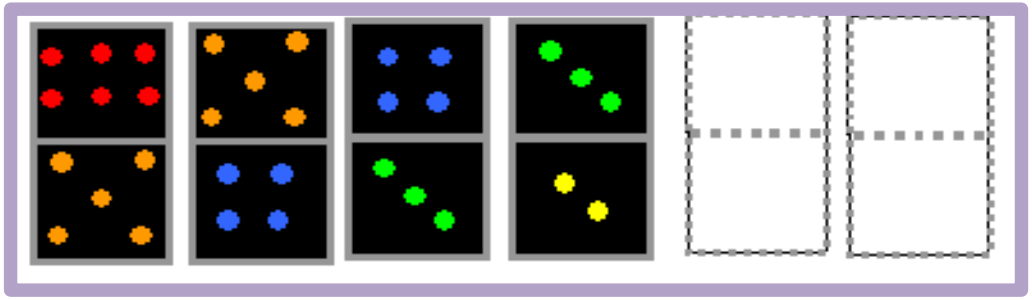




What is missing?



Can you draw the next domino?



Properties of 2D shapes and 3D objects: EL2

Mathematical Language : flat, curved, straight, round, solid, corner, face, side, edge, circle, square, rectangle, cube, cuboid, cone, triangle, star, diamond, sphere, cylinder, pyramid

CfE MNU 0-16a

Strategies and Approaches

Pupils should be encouraged to handle 2D shapes,3D objects and real objects and be given opportunities to talk abut the shapes/objects describing each item using appropriate vocabulary.

Allowing pupils opportunities to 'make' some objects of their own and discussing with a partner will encourage use of associated vocabulary.

Discussing 3D shapes in the world around us using everyday objects which should be familiar to the children, for example, tins of beans, cereal packets and a tent can be a good starting point when teaching this concept.

Through practical exploration, identification and comparison, pupils should be taught to 'see' similarities and differences between 2d shapes and 3d objects

Ensure that children see shapes in a variety of forms. For example, when showing triangles, pupils should be able to recognise, describe and sort these :-

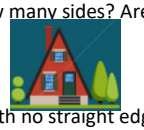
- If pupils only experience triangles with a horizontal base; they may not realise that different triangles can have different types of lines and angles and face different directions; this can have an impact on children's learning later on.

Digital Learning:

Resources

Questions to Enable Higher Order Thinking Skills

- What do you notice about this house- Can you make it out of plasticine? Can you describe it? How many sides? Are they all the same size? Are they straight or curved?



- Show me……. A shape with no straight edges, a shape with a triangle as a face, a shape which is longer than my cube…
- What is the same? What is different?

- What is the same/different about these shapes?

- Which could be the odd one out and why? Could each of them be the odd one out? Explain your thinking.

- What 2d shapes can you see?
- Where can we find circles in the shop?
- Can you match these lids to the jars or boxes?
- Without using its name, describe a thin plastic shape hidden in a feely bag. My shape has three corners and three sides. What can it be?
- My shape is curved all the way round. What can it be?
- Show a small part of the shape; What shape might it be? Why? What shape can't it be? Why?
- Sort into trays a collection of varied flat shapes, either thin plastic shapes, shapes made from paper, or drawn or stuck on card. Tell me how you sorted the shapes? Can you sort them so that all the ones with three sides are together? Can you find all the shapes which are not square? Can you find the shapes which are not round?

Barriers to Learning

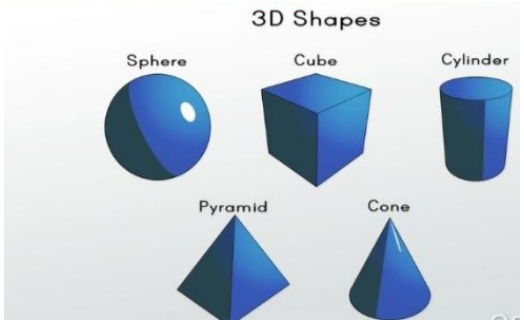
- Children need to be given many examples of shapes and precise language related to the concept of a particular shape. Much discussion needs to take place for children to recognise the number of sides and angles of shapes, and whether they are open or closed .

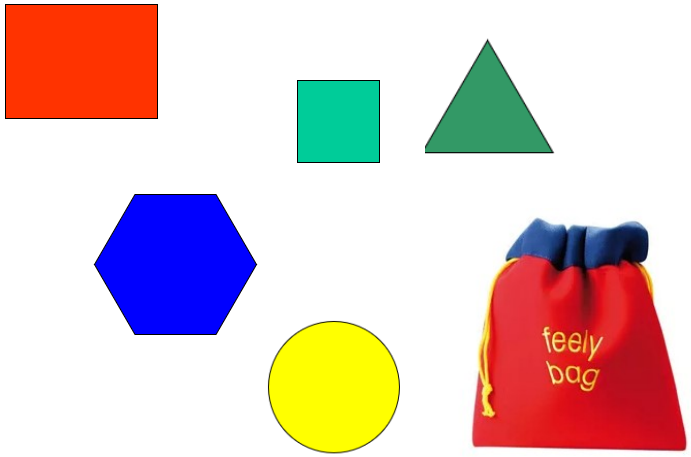
End of Level Benchmark

- *Recognises, describes and sorts common 2D shapes and 3D objects according to various criteria, for example, straight, round, flat and curved.*

Resources – 2D shapes and 3D objects

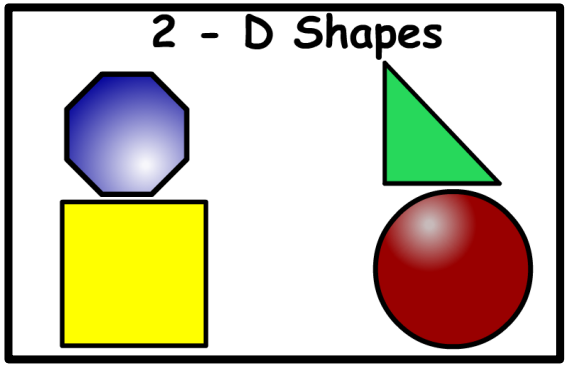
Common Classroom Resources





Our school resources:
(textbooks, HAM, Big Maths, worksheets, etc.)

Online Resources



Nrich Investigation: Matching Triangles-
https://nrich.maths.org/5638/note

Nrich Investigation: Sorting Logic Blocks-
https://nrich.maths.org/7192/note

Angles, Symmetry and Transformation: Early Level

Mathematical Language : in front, behind, above, below, left, right, forwards, backwards, over, under, top, bottom, side, outside, inside, around, between, before, after, next to, near, far, along, turn, along, symmetry, symmetrical, shade, divide, half, quarter

CfE MNU 0-17a
MNU0-19a

Strategies and Approaches

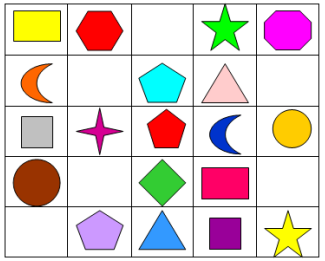
- Positional and directional language can be linked to daily classroom instructions. For example- use associated vocabulary to describe how things are stored on shelves in the classroom or in a cupboard. Are the felt pens on top of, under, next to… the books?
- Go around the chair, go in front of the table, crawl under the bridge, go over the tyres and stop behind the swing.
- Describe a walk round the school or its grounds: Take photographs of the journey to use back in the classroom. We went along the path, through the tunnel in the adventure playground and then across the field…
- Explore and talk about things that turn, such as the hands of a clock, wheels, taps, keys in locks, screw top lids on jars…
- This concept can link well and be explored through physical education activities. For example- to get through an obstacle course or over climbing equipment in PE, stand in front of, behind, beside, opposite a partner… or between two others…, follow instructions to run forwards, walk backwards, turn on the spot, turn to the left, turn to the right, face the front, or side, or back, or corner of the room, move away from the bars, slide down the ramp, roll on the mat…

Digital Learning:

Programming routes for the 'Beebot' to negotiate pathways

Resources

Questions to Enable Higher Order Thinking Skills



- Which shape is to the right of the yellow rectangle?
- Which shape is below the green diamond?
- Can you draw a blue moon to the right of the pink rectangle?
- Can you draw a green star above the orange circle?
- What can you tell me about the position of these shapes:-

Barriers to Learning

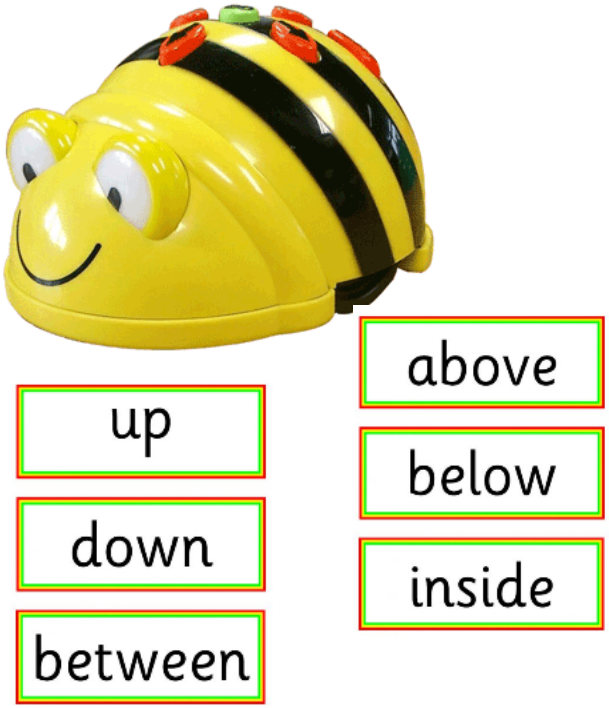
- Some pupils may think that just dividing a shape into any two pieces is halving but do not understand that they need to be equal pieces (link with fractions and shape).
- The teaching and learning of position and direction is very language based and this may be difficult for some children – activities should be active, modelled and incorporated into daily tasks.

End of Level Benchmark

- *Understands and correctly uses the language of position and direction, including in front, behind, above, below, left, right, forwards and backwards, to solve simple problems in movement games.*
- *Identifies, describes and creates symmetrical pictures with one line of symmetry.*

Resources – Angles, Symmetry and Transformation

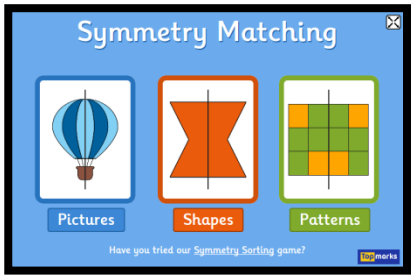
Common Classroom Resources

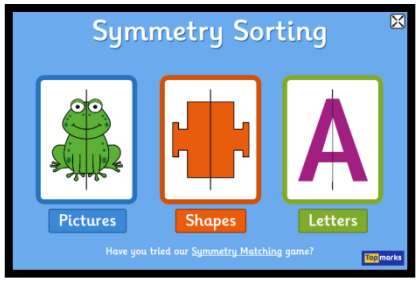


Positional Vocabulary Cards

Our school resources:
(textbooks, HAM, Big Maths, worksheets, etc.)

Online Resources





Early Position activities

These activities are most suitable for Reception children. They take 'relative position' as their focus and encourage pupils to understand and practise positional language.

Woodland Disco

- The three woodland creatures must be placed into the positions requested before they can start their disco! Full sound support is given for the instructions.

Naming Positions - The Picnic

- Practise positional language by choosing the word that best describes the position of a creature.

Position Them - The Picnic

- Pupils act on positional instructions, by moving the creature into the position requested in the sentence at the top.

Naming Positions - The Tree

- Practise positional language by choosing the word that best describes the position of a creature.

Position Them - The Tree

- Pupils act on positional instructions, by moving the creature into the position requested in the sentence at the top.

Nrich Investigation: Coloured Squares
https://nrich.maths.org/234/note

Data Handling and Analysis: Early Level

Mathematical Language : count, sort, group, set, list, same, different, table, data, information, graph, tally marks, popular, altogether, most, least

CfE MNU 0-20a
MNU0-20b

Strategies and Approaches

- Traditionally, children find analysing data difficult. This may be as a result of too much time being spent on drawing graphs/charts, and not enough time on actually finding out what the graph/chart is telling us (interpreting).When planning data handling opportunities for learners, it is essential to ensure a balance of activities are provided, including: collecting, organising, representing, interpreting and discussing data.
- When creating a pictogram, demonstrate the importance of keeping the pictures/symbols the same size. Failing to do so, may lead to pupils assuming that the 'tallest column of pictures' is the most popular answer. Ensure pupils are familiar with adding a key/title at this stage so that this becomes embedded.
- It is useful for learners to be familiar with counting in steps of equal size e.g. if a picture represents 2, use the counting stick to practice counting in 2s.
- Use a bar model to visually represent 'how many more …' can lead pupils to the correct calculation.

Digital Learning:

Resources

Questions to Enable Higher Order Thinking Skills

type of pet	number of students who own this pet
cat	𝍸 𝍸 𝍸 ||
dog	𝍸 𝍸
turtle	𝍸 ||
hamster	||
rabbit	|
gerbil	||

- Which two pets have the same number of tally marks?
- What is the difference between the number of students owning a cat and a rabbit?
- How many more students own a dog than a gerbil?
- How many students were asked altogether?
- Which is the most/least popular? Why do you think this is?

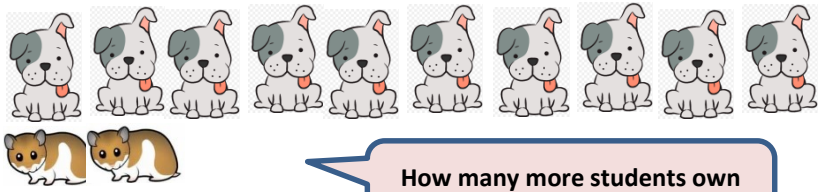
Barriers to Learning

- Pupils who have difficulty in understanding and handling data skills usually have gaps in their general mathematics understanding that, in turn, can prevent them developing an understanding within handling data activities. Problems may be due to:

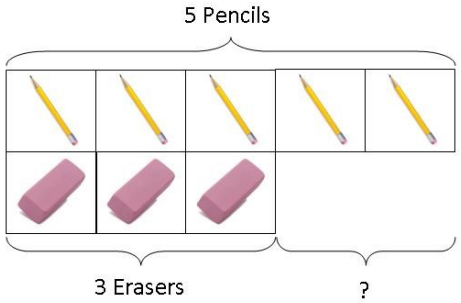
- poor calculation skills;
- lack of strategies or alternative approaches;
- data not in a meaningful context for them;
- not making connections with everyday examples

End of Level Benchmark

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



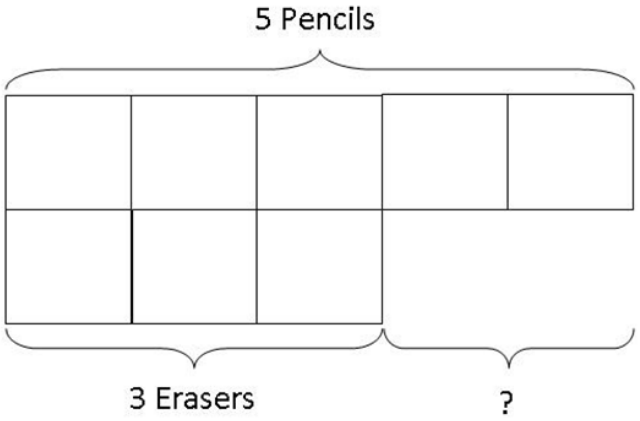
How many more students own a dog than a gerbil?

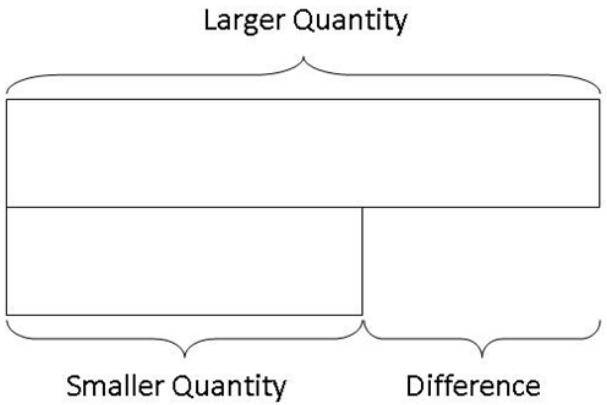


Peter has 5 pencils and 3 erasers.

How many more pencils than erasers does he have?

Leading to-





Tom has 8 bears. Julie has 2 bears.

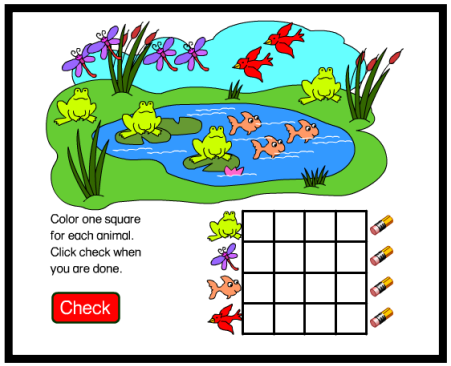
How many more bears does Tom have?

Resources – Data Handling and Analysis

Common Classroom Resources

Our school resources:
(textbooks, HAM, Big Maths, worksheets, etc.)

Online Resources



Nrich Activity – Sticky Data
https://nrich.maths.org/7687/note