Glasgow Counts in our Playrooms
Shape and Space

THE SCOTTISH ATTAINMENT CHALLENGE
LITERACY NUMERACY
HEALTH & WELLBEING

Glasgow's Improvement Challenge
Unlocking Learning

Professional Learning gtc SCOTLAND 2018 EXCELLENCE AWARD

LPA Year 2

Glasgow's Improvement Challenge (GIC)
Health & Safety

"Distance Aware" ….. Encouraging people to take care and respect the space of others

All participants should choose a seat on entry and use this space for the full training session. Please wipe desks/communal tables before leaving.

Doors and windows will be opened to increase natural ventilation where it is practical, safe and secure to do so while maintaining appropriate internal temperatures.

Tea and toilet facilities should be used at designated areas, following signage

Take Away Task (Session 1)

- Share patterning provocation photos/videos (or what you did as a result of last session).
- Discuss how you got on baselining TIG's Pattern and Relationships skills.
- Discuss the Numeracy Rich Learning Environment Audit (pattern section) – strengths/areas for improvement (quality assurance).

Aims

- To discuss what shape and space means
- To explore the GCIP framework and highlight digital enhancements
- To consider developmental stages and progression in shape and space
- To explore the key concepts of shape and space with consideration for the learning environment
- To identify learning and next steps in an observations (Learning Stories)

Reflection

- What does shape and space mean to you?
- What was your experience?
- What opportunities do you provide for shape and space in your establishment?

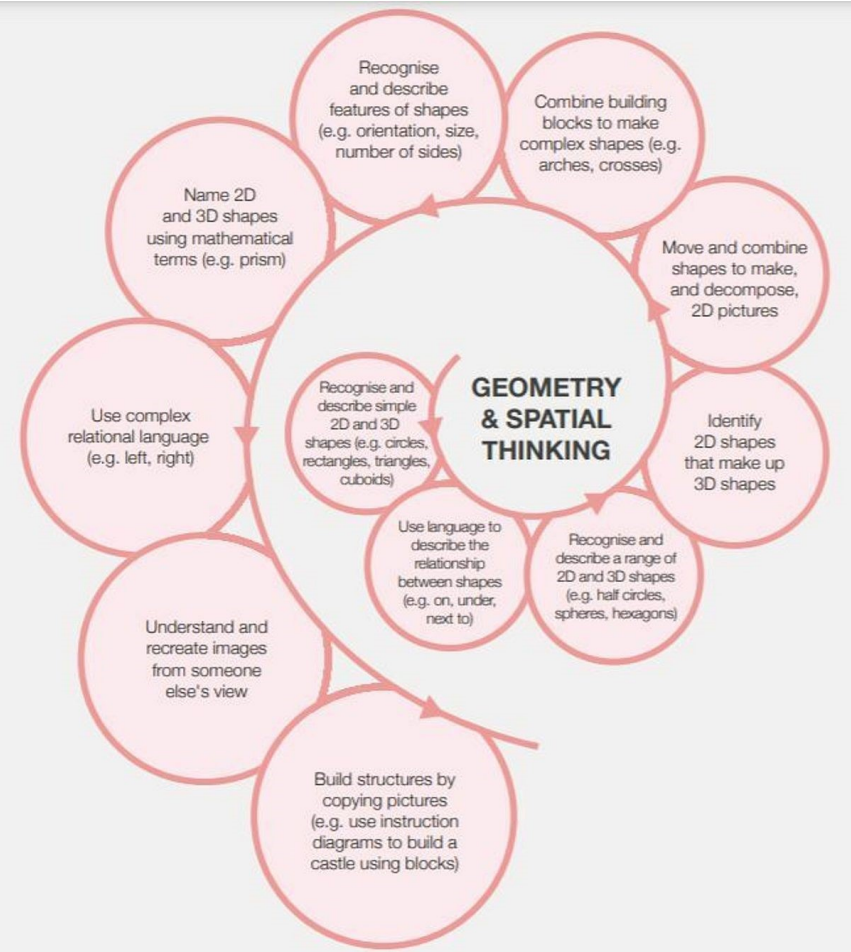
What is shape and space?

"Understanding shape and space is essential for making sense of the world since all physical objects possess three-dimensional shape and are located in spaces within our environment."

Montague-Smith et al: (2012)

Mathematics in Early Years Education

Spatial Awareness/Reasoning



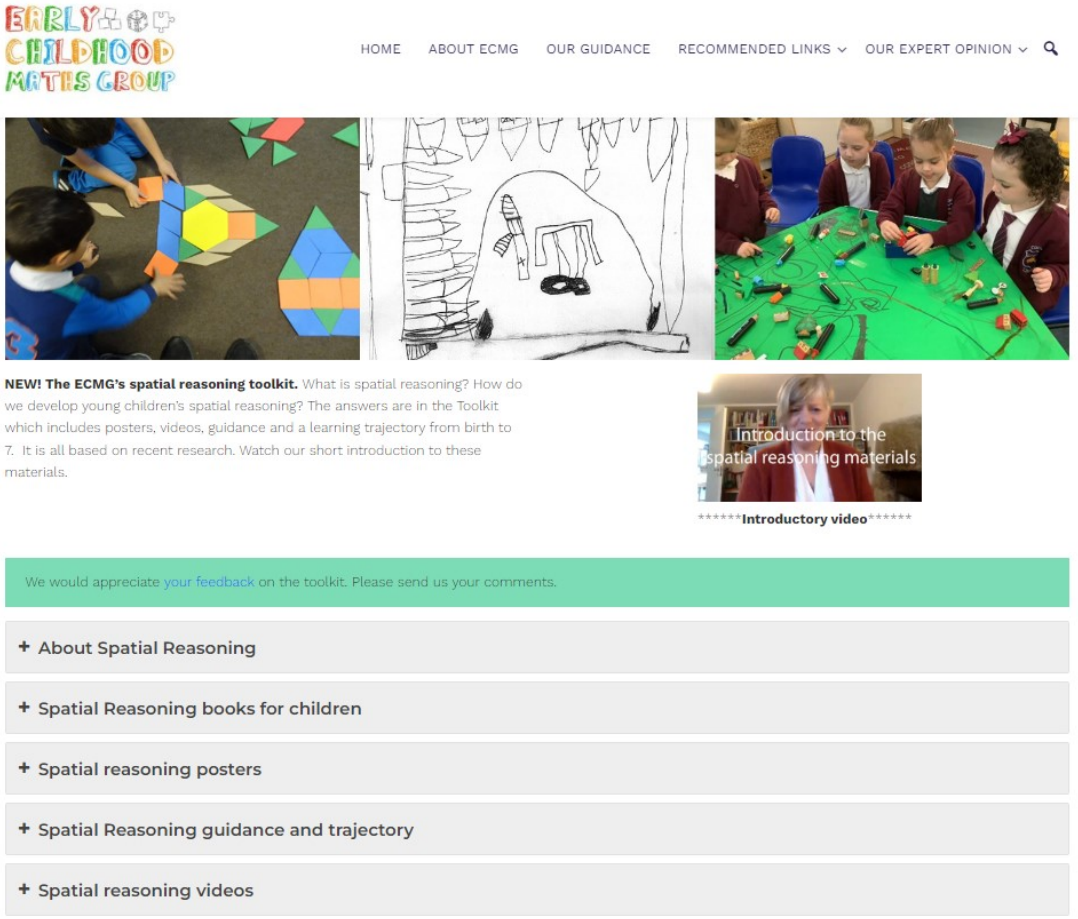
"...majority of practitioners working with birth to 7-year-olds (64%) were 'not at all' or only 'a little' confident in their understanding of spatial thinking."

Farren and Gripton (2022); *Improving mathematics through spatial thinking*

Image: EEF (2020); *Improving Mathematics in the Early Years and Key Stage 1*

Early Childhood Maths Group

Spatial Reasoning Toolkit



Everyday experiences of shape and space

- Observing, recognising and identifying 2D and 3D shapes in the world around us
- Classifying and sorting variety of objects/items e.g., clothes, toys, food
- Fitting objects together and taking apart – enclosure schema, shopping – packing and unpacking bags.
- Construction – constructing and deconstructing models
- Following directions e.g., “put the ball in the box”, “go to the shelf and get a pencil”
- Patterns of symmetry in the environment e.g., butterflies, leaves, built environment

Predictors of later achievement

- Counting out a number from a group
- Subitising
- Numeral meanings
- Relative number sizes
- Predicting adding one/taking one
- Number combinations
- Spontaneously focusing on numerosity
- Finger gnosis!
- Pattern awareness
- **Spatial reasoning**

Dr Sue Gifford,
Early Years Conference

Glasgow Counts Framework

Properties of 2D and 3D Shape
Early Level E's and O's

I enjoy investigating objects and shapes and can sort, describe and be creative with them.

MTH 0-16a

Angle, Symmetry and Transformation Early Level E's and O's

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

Shape, Position & Movement Progression Pathways: Early Level

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.

Glasgow Counts Framework

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 Mass Capacity	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	
Patterns & Relationships		Copies simple patterns involving objects , shapes and numbers	Continues simple patterns involving objects , shapes and numbers		Creates simple patterns involving objects , shapes and numbers	
Shape		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	
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. Makes relevant choices and decisions based on the data

Glasgow Counts Framework

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

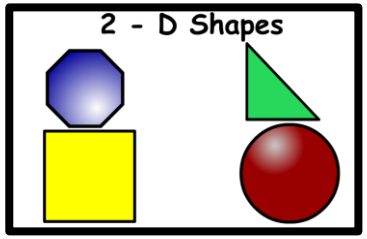
- Pentominos

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

Glasgow Counts Framework

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
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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

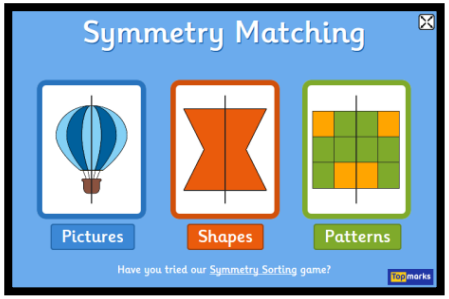
up

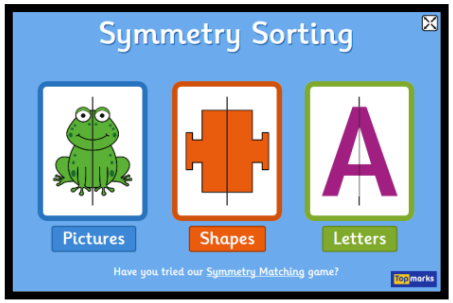
down

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

Digital Enhancements

Digital Enhancements

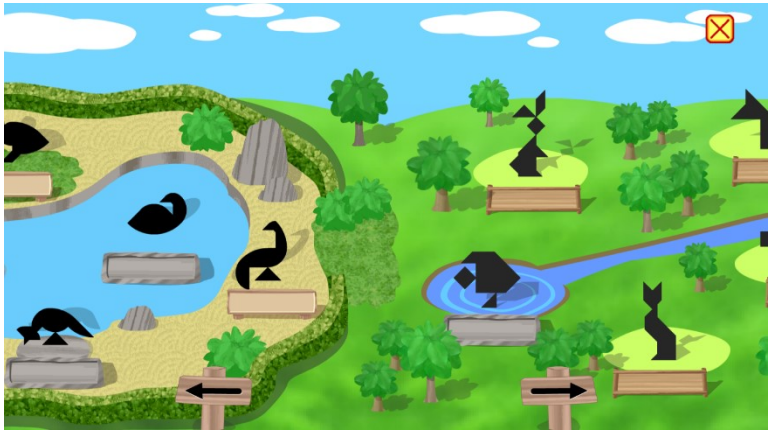
Early Level Tracker

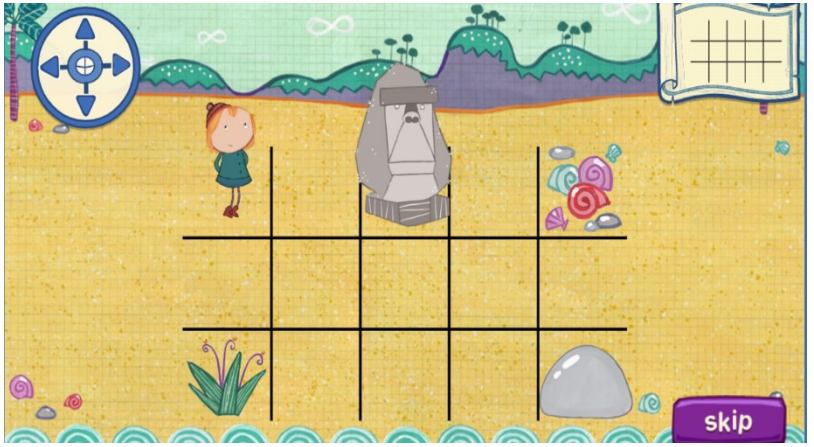
Digital Literacy	Using digital products and services in a variety of contexts to achieve a purposeful outcome	Recognises different types of digital technology	Uses digital technologies in a responsible way with appropriate care	Identifies different applications and programs by icon	Logs on to devices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

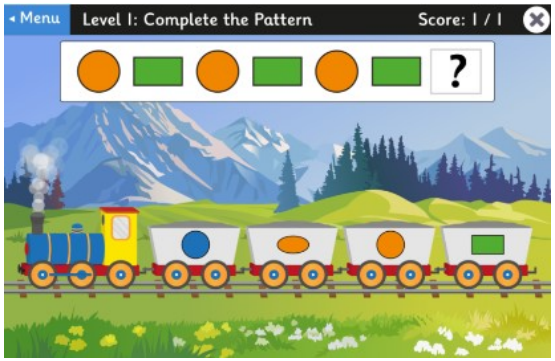
Digital Enhancements

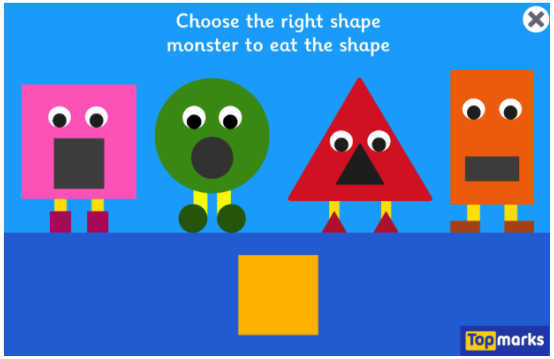
Digital Enhancements

Digital Enhancements









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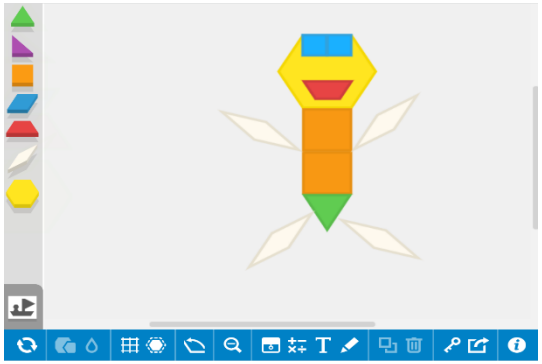


Developmental Stages

Realising the Ambition

When I am a baby...

- Provide a range of richly illustrated books for me. Discuss the illustrations with me using language such as bigger, smaller, up, down, under, over.
- Involve me in simple counting songs with repetition of rhyme and rhythm.
- Encourage me to notice how numbers are evident in my environment.
- Give me time and space to explore toys and materials from different angles and move around freely to investigate my surroundings in terms of position and how my body works.
- Water and sand play are important for me, model pouring and measuring for me to experiment with.
- Provide materials such as paint and clay for me to explore, discussing with me categorising concepts such as hard, soft, wet, dry.
- Encourage me to sort and recognise and make patterns, supporting me to notice differences.
- Encourage my awareness of shape within natural contexts and environments.
- Enable me to play outdoors every day which includes discussing, for example, how the wind blows, the features of natural materials, exploring the textures, weight and size of items such as stones, twigs and plants.

When I am a toddler...

- Provide richly illustrated books with representations of number, shape and pattern to support conversations with me around these concepts.
- Sing and recite counting songs and rhymes with me, linking to visual representations using rhyme and rhythm.
- Encourage me to notice and use numbers as I explore my environment.
- Encourage me to have fun and play with numbers; investigating and experimenting with quantity, through comparing and contrasting a variety of objects using mathematical language such as less than, more than, same as.
- Continue to give time and space for me to explore toys and materials from different angles.
- Encourage me to move around freely to investigate my surroundings in terms of position and how my body works.
- Ensure my water and sand play is developing more specific language around pouring, measuring, volume, and capacity.
- Provide a variety of materials for me to explore, discussing with me categorising and sorting concepts such as hard, soft, wet and dry.
- Encourage me to sorting and play with patterns, supporting me to identify the characteristics of different objects.
- Encourage me to identify and explore shape within natural contexts and environments.
- Enable daily outdoor play which encourages me to explore natural materials through movement and to gain an understanding of textures, weights and sizes of items.

Developmental Stages

When I am a young child...

- Continue to provide me with richly illustrated story books with representations of number, shape and pattern to support conversations around these concepts.
- Continue to sing and recite counting songs and rhymes linking to visual representations of numbers that involve counting, ordering and recognising number.
- Encourage me to notice how numbers are evident in my environment and to enjoy using and writing numbers for a purpose.
- Continue to encourage me to play with numbers, having fun investigating and experimenting with quantity, through comparing and contrasting a variety of objects using mathematical language such as less than, more than, same as.
- Support my understanding and use of positional language within everyday experiences and through activities such as role-play, board games, digital technologies and programmable toys.
- Continue to include water and sand play to encourage me to explore, experiment, test and extend ideas developing more specific language and understanding around pouring, measuring, volume, and capacity.
- Provide a variety of materials which encourage my reasoning through experimentation, trial and error and prediction based on my developing understanding of mathematical concepts.
- Encourage me to create my own patterns and sets of objects, identifying and talking about the characteristics we notice together.
- Encourage me to identify and explore shape and symmetry, developing an understanding of characteristics within natural contexts and environments.
- Enable daily outdoor play which encourages me to explore size and perspective through my movements and by seeing familiar objects from a different angle, height or distance.

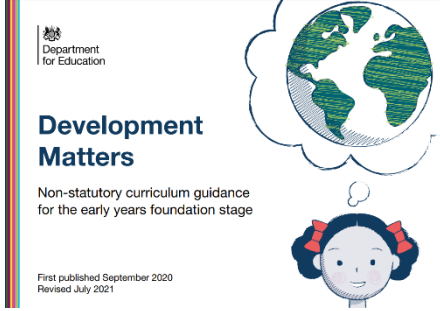
Development Matters

Birth to three – babies, toddlers and young children will be learning to:	Examples of how to support this:
Climb and squeeze themselves into different types of spaces. Build with a range of resources. Complete inset puzzles.	Describe children's climbing, tunnelling and hiding using spatial words like 'on top of', 'up', 'down' and 'through'. Provide blocks and boxes to play freely with and build with, indoors and outside. Provide inset puzzles and jigsaws at different levels of difficulty.
Compare sizes, weights etc. using gesture and language - 'bigger/little/smaller', 'high/low', 'tall', 'heavy'.	Use the language of size and weight in everyday contexts. Provide objects with marked differences in size to play freely with. Suggestions: dolls' and adult chairs, tiny and big bears, shoes, cups and bowls, blocks and containers.
Notice patterns and arrange things in patterns.	Provide patterned material – gingham, polka dots, stripes etc. – and small objects to arrange in patterns. Use words like 'repeated' and 'the same' over and over.

Development Matters

3 and 4-year-olds will be learning to:	Examples of how to support this:
Experiment with their own symbols and marks as well as numerals. Solve real world mathematical problems with numbers up to 5. Compare quantities using language: 'more than', 'fewer than'.	Encourage children in their own ways of recording (for example) how many balls they managed to throw through the hoop. Provide numerals nearby for reference. Suggestions: wooden numerals in a basket or a number track on the fence. Discuss mathematical ideas throughout the day, inside and outdoors. Suggestions: • "I think Jasmin has got more crackers…" • support children to solve problems using fingers, objects and marks: "There are four of you, but there aren't enough chairs…." • draw children's attention to differences and changes in amounts, such as those in stories like 'The Enormous Turnip'.
Talk about and explore 2D and 3D shapes (for example, circles, rectangles, triangles and cuboids) using informal and mathematical language: 'sides', 'corners'; 'straight', 'flat', 'round'.	Encourage children to play freely with blocks, shapes, shape puzzles and shape-sorters. Sensitively support and discuss questions like: "What is the same and what is different?" Encourage children to talk informally about shape properties using words like 'sharp corner', 'pointy' or 'curvy'. Talk about shapes as you play with them: "We need a piece with a straight edge."

Development Matters



3 and 4-year-olds will be learning to:	Examples of how to support this:
Understand position through words alone – for example, "The bag is under the table," – with no pointing. Describe a familiar route. Discuss routes and locations, using words like 'in front of' and 'behind'.	Discuss position in real contexts. Suggestions: how to shift the leaves **off** a path or sweep water away **down** the drain. Use spatial words in play, including 'in', 'on', 'under', 'up', 'down', 'besides' and 'between'. Suggestion: "Let's put the troll under the bridge and the billy goat beside the stream." Take children out to shops or the park: recall the route and the order of things seen on the way. Set up obstacle courses, interesting pathways and hiding places for children to play with freely. When appropriate, ask children to describe their route and give directions to each other. Provide complex train tracks, with loops and bridges, or water-flowing challenges with guttering that direct the flow to a water tray, for children to play freely with. Read stories about journeys, such as 'Rosie's Walk'.
Make comparisons between objects relating to size, length, weight and capacity.	Provide experiences of size changes. Suggestions: "Can you make a puddle larger?", "When you squeeze a sponge, does it stay small?", "What happens when you stretch dough, or elastic?" Talk with children about their everyday ways of comparing size, length, weight and capacity. Model more specific techniques, such as lining up ends of lengths and straightening ribbons, discussing accuracy: "Is it **exactly**…?"

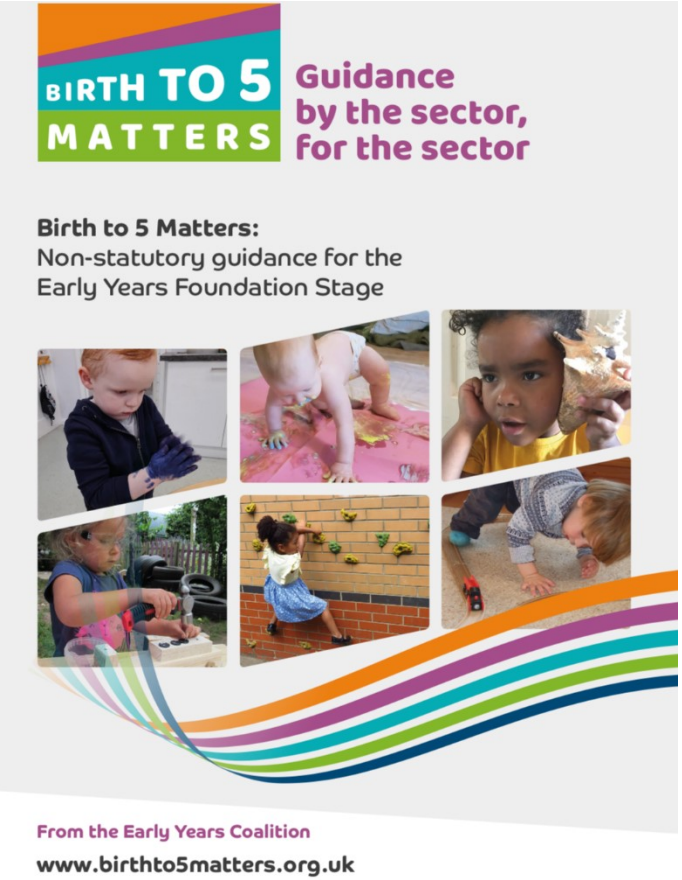
Development Matters

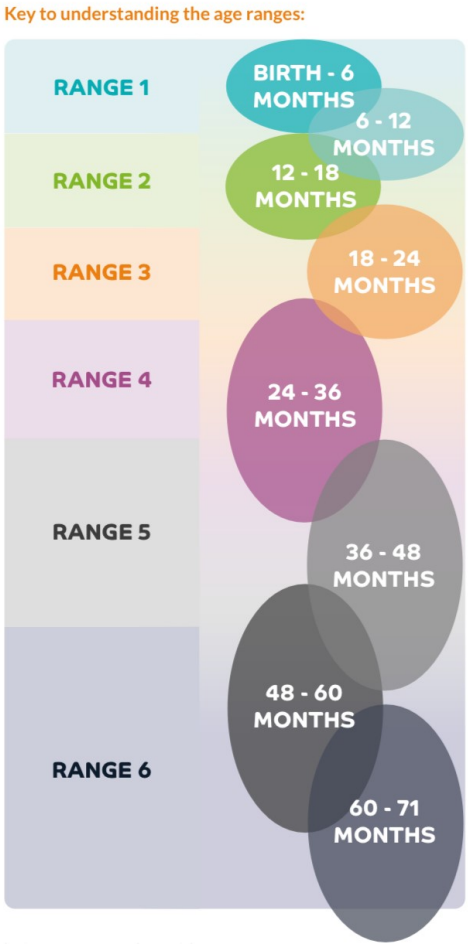
3 and 4-year-olds will be learning to:	Examples of how to support this:
Select shapes appropriately: flat surfaces for building, a triangular prism for a roof, etc. Combine shapes to make new ones – an arch, a bigger triangle, etc.	Provide a variety of construction materials like blocks and interlocking bricks. Provide den-making materials. Allow children to play freely with these materials, outdoors and inside. When appropriate, talk about the shapes and how their properties suit the purpose. Provide shapes that combine to make other shapes, such as pattern blocks and interlocking shapes, for children to play freely with. When appropriate, discuss the different designs that children make. Occasionally suggest challenges, so that children build increasingly more complex constructions. Use tidy-up time to match blocks to silhouettes or fit things in containers, describing and naming shapes. Suggestion: "Where does this triangular one /cylinder /cuboid go?"

Development Matters

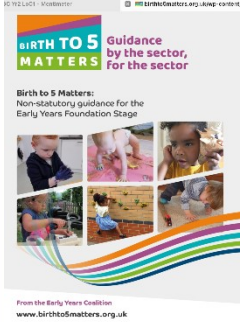
Children in reception will be learning to:	Examples of how to support this:
Select, rotate and manipulate shapes to develop spatial reasoning skills.	Provide high-quality pattern and building sets, including pattern blocks, tangrams, building blocks and magnetic construction tiles, as well as found materials. Challenge children to copy increasingly complex 2D pictures and patterns with these 3D resources, guided by knowledge of learning trajectories: "I bet you can't add an arch to that," or "Maybe tomorrow someone will build a staircase." Teach children to solve a range of jigsaws of increasing challenge.
Compose and decompose shapes so that children recognise a shape can have other shapes *within* it, just as numbers can.	Investigate how shapes can be combined to make new shapes: for example, two triangles can be put together to make a square. Encourage children to predict what shapes they will make when paper is folded. Wonder aloud how many ways there are to make a hexagon with pattern blocks. Find 2D shapes within 3D shapes, including through printing or shadow play.
Continue, copy and create repeating patterns.	Make patterns with varying rules (including AB, ABB and ABBC) and objects and invite children to continue the pattern. Make a deliberate mistake and discuss how to fix it.
Compare length, weight and capacity.	Model comparative language using 'than' and encourage children to use this vocabulary. For example: "This is heavier than that." Ask children to make and test predictions. "What if we pour the jugful into the teapot? Which holds more?"

Birth to 5 Matters





Birth to 5 Matters

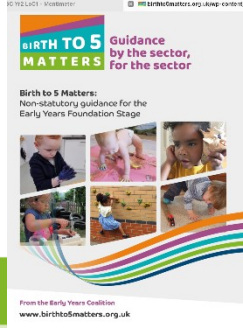


Mathematics

RANGE 1

A Unique Child: what a child might be doing	Positive Relationships: what adults might do	Enabling Environments: what adults might provide
 **Number** • Reacts to changes of amount when those amounts are significant (more than double)	• Notice and mirror children's reactions to changes in amount. • Add to objects & draw attention to the change in amount, using words like *more*. • When feeding babies comment on whether they would like more after being winded, e.g. *Oh, you want more.* • Use feeding, changing and bathing times for finger-play with young babies	• Provide small groups of the same objects in treasure baskets, as well as single items.
Spatial awareness • Explores space when they are free to move, roll and stretch • Developing an awareness of their own bodies, that their body has different parts and where these are in relation to each other	• Support babies' developing awareness of their own bodies e.g. through baby massage and singing songs • During floor play sometimes place objects that are just in or just out of reach, including small objects on cloths that babies can pull towards themselves.	• Provide opportunities for babies to move freely on carpets, grass etc. Observe and sensitively support babies' play and give them long stretches of uninterrupted time to explore. • Provide low mirrors to support babies to develop a body awareness.
Shape • Explores differently sized and shaped objects • Beginning to put objects of similar shapes inside others and take them out again	• Encourage babies' explorations of the characteristics of objects, e.g. by rolling a ball or sliding a block. • Demonstrate putting items inside others of similar shape	• Provide interestingly shaped objects to explore. • Make towers for children to knock down using objects that stack.
Pattern • Shows interest in patterned songs and rhymes, perhaps with repeated actions • Experiences patterned objects and images • Begins to predict what happens next in predictable situations	• Sing patterned songs and rhymes with predictable movements or actions (including from children's families). • Move with babies to the rhythm patterns in familiar songs, Encourage older babies to join in tapping and clapping along to simple rhythms. • Use repeated noises, movements and activities. • Play simple "to and fro" games, passing and rolling between the adult and child so they begin to predict which comes next.	• Plan for adults to have time to enjoy repetitive activities with babies. • Provide resources with high-contrast patterns.
Measures • Responds to size, reacting to very big or very small items that they see or try to pick up	• Comment on the size and weight of objects when babies grasp objects that are *big* or *heavy*. • During water play and bathing routines, show filling and emptying containers. • At the end of mealtimes show and comment on the empty bowl, cup or bottle: *All gone!*	• Provide a range of objects of various lengths and weights in treasure baskets to excite and encourage babies' interests including larger and smaller items.

Birth to 5 Matters

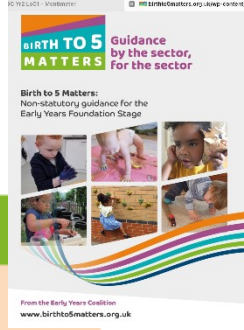


Mathematics

RANGE 2

A Unique Child: what a child might be doing	Positive Relationships: what adults might do	Enabling Environments: what adults might provide
 **Number** • May be aware of number names through their enjoyment of action rhymes and songs that relate to numbers • Looks for things which have moved out of sight	• Take opportunities during play to sing number rhymes. • During personal care routines make a point of using numbers. • Play peek-a-boo hiding games with toys and people.	• Plan to sing number rhymes with actions. Involve families in sharing number rhymes from home cultures.
Spatial awareness • Explores space around them and engages with position and direction, such as pointing to where they would like to go	• Use spatial words during everyday play and routines. or one-word comments e.g. as you get children *in* and *out* of a highchair. • Take opportunities to play hide and reveal games with objects in boxes and under cups. • Support babies' physical experience of positions and direction, e.g. describing *up* and *down*.	• Play games that involve curling and stretching, popping *up* and bobbing *down*. • Provide boxes, cloths and bags for children to store, hide and transport items. • Provide nested boxes, cups and toys of different sizes that fit inside each other. • Share books that provide opportunities to use spatial language and describe movement
Shape • Stacks objects using flat surfaces • Responds to changes of shape • Attempts, sometimes successfully, to match shapes with spaces on inset puzzles	• When playing with malleable materials draw attention to shapes as they are created and changed.	• Provide blocks and boxes to stack, build and solve problems with. • Provide a range of inset puzzles and support children as they explore matching shapes with spaces.
Pattern • Joins in with repeated actions in songs and stories • Initiates and continues repeated actions	• Talk about patterns in the environment e.g. spots and stripes on clothing or bumps in the pavement. • Spot opportunities to play "back and forth" and repetitive "again" games.	• Sing familiar songs with repeated actions, jig to and tap out simple beats, encouraging children to join in. • Provide items for children to make repetitive sounds.
Measures • Shows an interest in objects of contrasting sizes in meaningful contexts • Gets to know and enjoys daily routine • Shows an interest in emptying containers	• During play and everyday contexts, comment on the sizes and weights of objects using a range of language such as *big, huge, enormous, long, tall, heavy*. • Talk about what is going to happen and what has happened during the day using *first, next and then*.	• Provide big and little versions of objects for children to play with and compare. • Share picture books showing objects of contrasting sizes.

Birth to 5 Matters



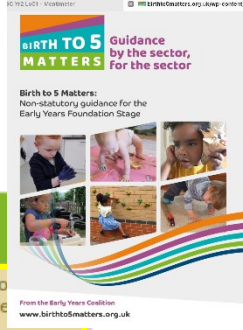
RANGE 3

A Unique Child: what a child might be doing	Positive Relationships: what adults might do	Enabling Environments: what adults might provide
Comparison • Responds to words like *lots* or *more* **Counting** • Says some counting words • May engage in counting-like behaviour, making sounds and pointing or saying some numbers in sequence **Cardinality** • Uses number words, like *one* or *two* and sometimes responds accurately when asked to give one or two things	• Talk with young children about *lots*, *more* and *not many* and *not enough* as they play. • Draw attention to contrasting differences and changes in amounts e.g. adding more bricks to a tower or eating things up. • Model counting things in everyday situations and routines. • Take opportunities to say number words in order with children as they play, e.g. *1,2,3 go!* • Use number words in meaningful contexts, e.g. *Here is your other mitten. Now we have two.*	• Play hiding games so children notice that something has *gone*. • Provide varied sets of objects for playful opportunities for children to independently explore *lots*, *more*, *not many* and *not enough*. • Count while engaging in everyday tasks and while moving around. • Sing songs with counting strings.
Spatial Awareness • Enjoys filling and emptying containers • Investigates fitting themselves inside and moving through spaces	• Model thinking during tidy up routines to promote logic and reasoning about where things fit in or are kept. • Support children's interest in body-sized spaces and provide commentary on the child going *inside*, *under*, *over*, *between and squeezing through*. • Look for opportunities to use spatial language during play activities.	• Designate specific places or spaces for items to be kept and fitted into for tidying. • Respect children's urge to explore spaces, to get inside and move between. • Build towers *up* for the child to knock *down*. • Provide shape sorters and packaging where children can hide, enclose or post items through holes.
Shape • Pushes objects through different shaped holes, and attempts to fit shapes into spaces on inset boards or puzzles • Beginning to select a shape for a specific space • Enjoys using blocks to create their own simple structures and arrangements	• Model thinking about the properties of shapes when selecting them to fit into spaces, e.g. *Oh look, we need a round one.* • When playing alongside children who are building, provide commentary about the shapes you are using.	• Provide a range of inset board and puzzles with large pieces. • Provide a range of construction materials for independent play. • Organise storage by their shape, with photos or silhouettes to show where things are kept.
Pattern • Becoming familiar with patterns in daily routines • Joins in with and predicts what comes next in a story or rhyme • Beginning to arrange items in their own patterns, e.g. lining up toys	• Highlight different times of the day and talk about what comes next within the pattern of the day. • Leave a space for children to do the next action or word in familiar songs and stories with repeating elements. • Comment on what is *the same* and what is *over and over again* in patterns found in the environment.	• Plan to share stories and songs that contain repeated elements which help children to anticipate what might come next.

Birth to 5 Matters

	A Unique Child: what a child might be doing	Positive Relationships: what adults might do	Enabling Environments: what adults might provide
RANGE 3 (cont.)	**Measures** • Shows an interest in size and weight • Explores capacity by selecting, filling and emptying containers, e.g. fitting toys in a pram • Beginning to understand that things might happen now or at another time, in routines	• Use the language of size and weight as children are involved in everyday play and routines. • Use the language of capacity as children explore water or sand to encourage them to think about when something is *full, empty or holds more.* • Emphasise the sequence within familiar activities or routines.	• Provide a range of objects, including big, and awkward ones that can be transport indoors and outdoors. • Provide different sizes and shapes of bags, boxes and containers so that children can experiment with filling, experiencing weight and size. • Plan to share images and books which show the order of daily routines.
RANGE 4	**Comparison** • Beginning to compare and recognise changes in numbers of things, using words like *more, lots or 'same'* **Counting** • Begins to say numbers in order, some of which are in the right order (ordinality) **Cardinality (*How many?*)** • In everyday situations, takes or gives two or three objects from a group • Beginning to notice numerals (number symbols) • Beginning to count on their fingers.	• Include the number sequence in everyday contexts and songs so children experience the order of the numbers (ordinality) • Encourage children to explore the collections they make, comparing amounts and counting some of the items, emphasising the last number, e.g. 1,2,3. *There are 3 leaves.* • Use opportunities to model and encourage counting on fingers. • When singing number rhymes with props, draw attention to contrasting differences and changes in numbers, checking together *How many now?* • Point out the number of things whenever possible, e.g. rather than just *chairs*, say *four chairs.* • Encourage children to use marks to represent their mathematical ideas in role play. • Help children to give or get two or three items, e.g. during snack time help children to take two pieces of fruit.	• Provide buckets and bags for children to create collections of objects which they can count. • Provide mark-making materials indoors and outdoors for children to represent their own ideas in play. • Provide opportunities for children to explore cardinality in the environment using self-correcting resources, e.g. jigsaw with two ducks and the number two, or displays showing the numeral and the number of items. • Sing counting songs and rhymes which help to develop children's understanding of number. • Say the counting sequence going to higher numbers, in a variety of contexts, indoors and out, and sometimes counting backwards.
	Spatial Awareness • Moves their bodies and toys around objects and explores fitting into spaces • Begins to remember their way around familiar environments • Responds to some spatial and positional language • Explores how things look from different viewpoints including things that are near or far away	• Encourage children to predict what they will see next on a familiar route. • Take everyday opportunities to use words for position and direction accompanied by gesture (e.g. *in, on, inside, under, over*) using equivalent terms for these in home languages through liaison with families where possible. • Enjoy games involving jumping, running and hiding and make very simple obstacle courses, e.g. *going up* and *down*. • Model your thinking when arranging things, using some position words. • Help children to create simple roads and rail tracks and talk about position. • Value children's explorations of spaces and viewpoints and their interest in how things look different.	• Design outdoor spaces where children can learn through a variety of spatial experiences (*going under, over, around, on top, through*) and hear spatial language in context. • Encourage children to freely communicate their mathematical thinking through gesture, talk and graphical signs. • Plan stimulating indoor and outdoor spaces where children make choices about where to go and create their own routes. Provide materials to create trails. • Provide resources for transporting.

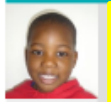
Birth to 5 Matters



RANGE 4 (cont.)

A Unique Child: what a child might be doing	Positive Relationships: what adults might do	Enabling Environments: what adults might provide
 **Shape** • Chooses puzzle pieces and tries to fit them in • Recognises that two objects have the same shape • Makes simple constructions	• Chat about the shape of the pieces and the holes when fitting pieces into inset puzzles. • Model comparing two objects to see if they have the same shape in purposeful contexts. • Suggest choosing a particular shaped item for a purpose. • Model your thinking when building.	• Provide a range of inset and jigsaw puzzles o increasing complexity for children to choose • Provide a variety of construction materials including some with identical pieces so that children freely explore *same* and *different*.
Pattern • Joins in and anticipates repeated sound and action patterns • Is interested in what happens next using the pattern of everyday routines	• Talk with children about the patterns you notice around you. • Comment on and help children to recognise the patterns they make in their mark making, loose parts and construction. • Draw children's attention to the patterns in their routines by asking what comes next.	• Provide a range of natural and everyday materials, as well as blocks and shapes, with which to make patterns. • Plan opportunities for children to experience pattern such as percussion, music and action games that involve repeated sounds or actions.
Measures • Explores differences in size, length, weight and capacity • Beginning to understand some talk about immediate past and future • Beginning to anticipate times of the day such as mealtimes or home time	• Use everyday opportunities to describe everyday items and contexts using informal language of size (*giant, teeny, big, little, huge, small*), length (*long, tall, short*), weight (*heavy, light*) and capacity (*full, empty*). • Observe children's problem-solving when ordering things by size, e.g. stacking cups, sensitively supporting by offering one if they are really struggling. • Look out for opportunities to compare things purposefully such as finding out whether a teddy will fit in a bed. • When children talk about their experiences at home and in the setting, use some language of time (*before, later, soon, next, after, morning, afternoon, evening, night-time*). • In everyday activities, make a commentary about the sequence of events. • When sharing stories and books, draw attention to routines and time sequences within them.	• Provide similar items of contrasting sizes so that children have many opportunities to encounter the language of size. • Provide resources with clearly different weights to support direct comparison, and something to carry them in. • Provide equipment with varied capacities and shapes in the sand, water, mud kitchen and role play areas.

Birth to 5 Matters

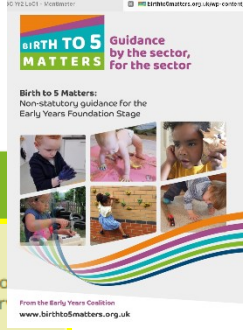


RANGE 5 (cont.)

A Unique Child: what a child might be doing	Positive Relationships: what adults might do	Enabling Environments: what adults might provide
Spatial Awareness • Responds to and uses language of position and direction • Predicts, moves and rotates objects to fit the space or create the shape they would like	• When children are exploring, use the language of position and direction in context (*in, on, inside, under, over,* progressing to *between, beside, next to through, along,* including relative terms which depend on where you are, e.g. *behind, in front of, forwards, backwards*) using equivalent terms for these in home languages through liaison with families where possible. • On walks, in pictures or while playing, point out how things or people that are far away look smaller. • Support children in their problem solving when they are creating rail tracks and road layouts. • In block play, sensitively support and challenge experienced builders to make bridges and enclosures. • Encourage children to persevere with jigsaws, perhaps demonstrating "hovering" jigsaw pieces to check if they will fit.	• Provide spaces to display children's ongoing mathematical thinking, e.g. their own ways of representing their thinking and scribing children's words. • Provide opportunities for children to explore position themselves *inside, behind, on top* and so on. • Provide picture books to stimulate discussion about position and direction. • Create trails and treasure hunts with the children. • Organise the indoor and outdoor environment with outlines for objects or specific places for children to tidy up items by fitting them into the designated space.
Shape • Chooses items based on their shape which are appropriate for the child's purpose • Responds to both informal language and common shape names • Shows awareness of shape similarities and differences between objects • Enjoys partitioning and combining shapes to make new shapes with 2D and 3D shapes • Attempts to create arches and enclosures when building, using trial and improvement to select blocks	• Help children to choose shapes for a purpose, e.g. a triangular block for a roof and the wedge-shaped block for a ramp. • Offer an appropriate or inappropriate shape for what you think the child's purpose might be to investigate their thinking. • As children experience shapes, use informal language (e.g. *slanty, pointy, twisty, wiggly, bumpy*), common shape names (e.g. *cylinder, cone, circle, square*) and "nearly" shapes (e.g. *This is almost a square but it's got curvy corners*). Find out and use equivalent terms for shapes in home languages. • Discuss how shapes can be partitioned in everyday contexts, e.g. cutting food in different ways. • Value children's constructions and solutions to problems they have set themselves and talk about how the shapes have combined to make new shapes.	• Provide differently shaped resources to handle, carry, move and explore. • Provide large and small blocks and boxes for construction both indoors and outdoors.

Developmental Stages

Birth to 5 Matters

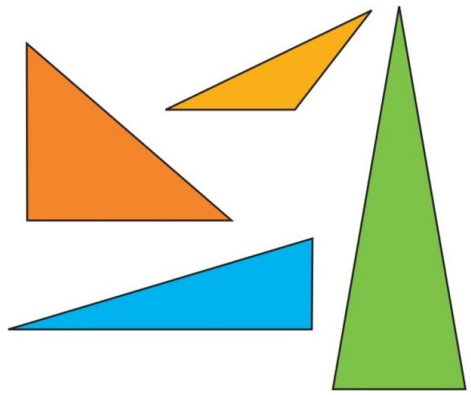


	A Unique Child: what a child might be doing	Positive Relationships: what adults might do	Enabling Environments: what adults might provide
RANGE 6 (cont.)	**Spatial Awareness** • Uses spatial language, including following and giving directions, using relative terms and describing what they see from different viewpoints • Investigates turning and flipping objects in order to make shapes fit and create models; predicting and visualising how they will look (spatial reasoning) • May enjoy making simple maps of familiar and imaginative environments, with landmarks	• Encourage the use of relative terms (*in front of, behind, before and after, in a line, next to and between*). • Encourage children to explore what can be seen from different viewpoints. • Encourage children to describe position and give directions in play and in everyday routines. • Encourage children to create scaled-down models such as in small world play. • When children are fitting shapes into an outline or making a model from a 2D picture, help them to select more spatially challenging activities. • Encourage children to make maps of routes they have walked or travelled in some way.	• Play barrier games (where players have an identical set of objects which are hidden from each other; one player makes an arrangement o objects and gives instructions to the other to tr to make the same arrangement). • Plan opportunities for children to describe and recall familiar routes. • Engage families in taking photos of familiar things from different viewpoints.
	Shape • Uses informal language and analogies, (e.g. *heart-shaped and hand-shaped leaves*), as well as mathematical terms to describe shapes • Enjoys composing and decomposing shapes, learning which shapes combine to make other shapes • Uses own ideas to make models of increasing complexity, selecting blocks needed, solving problems and visualising what they will build	• Encourage children to use the names of shapes and their properties (e.g. *straight, curved, edges*) and prompt them to say what shapes remind them of. • Discuss different examples of the same shape (e.g. equilateral and right-angled triangles) in a variety of orientations. • Take opportunities to discuss the shapes that children paint, draw and collage and shapes noticed in their local environment using regular shapes and shapes with no name. • When acting out their own stories encourage children to make the shapes involved on their own or with others. • When constructing, sensitively discuss which shapes make other shapes (e.g. triangles making rectangles and hexagons with pattern blocks or mosaic tiles). • Challenge children to make more complex constructions such as towers of arches, a window or a staircase.	• Provide resources for shape play including unit blocks, pattern blocks, mosaic tiles and jigsaw puzzles with different levels of challenge. • Teach strategies for solving shape and jigsaw puzzles, describing shape properties and modelling the mathematical vocabulary such as *straight, corner, edges.* • Play games focussing on the properties of shapes, such as hiding and partially revealing a shape, asking children to say what different shapes it could be or not, and why.
	Pattern • Spots patterns in the environment, beginning to identify the pattern "rule" • Chooses familiar objects to create and recreate repeating patterns beyond AB patterns and begins to identify the unit of repeat	• Encourage children to notice and appreciate a range of patterns involving repetition and symmetry in the environment, including traditional patterns from a range of cultures. • Model using symbols to represent a pattern in other ways (e.g. using a spot/cross/dash pattern of symbols and doing a twirl/jump/glide in response). • Make deliberate mistakes when creating patterns alongside children and playfully challenge them to fix the problem. • Make border patterns where the repeating pattern continues around an object or frame.	• Provide opportunities for printing patterns using a variety of objects. • Using photos, challenge children to copy and continue patterns. • Invite children to create a pattern with the same structure using different objects (e.g. instead of a red/blue/blue pattern, create a sheep/cow/cow pattern).

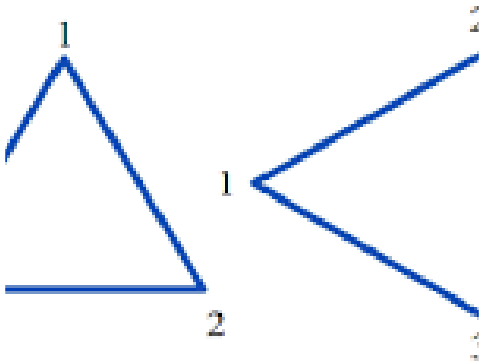
Key Concepts of Shape and Space

Considerations for Exploring Shape

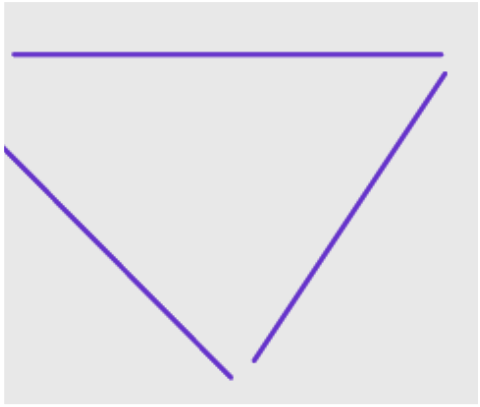
"Clements et al. (1999) emphasises three essential elements of teaching about shape…"



Regularity

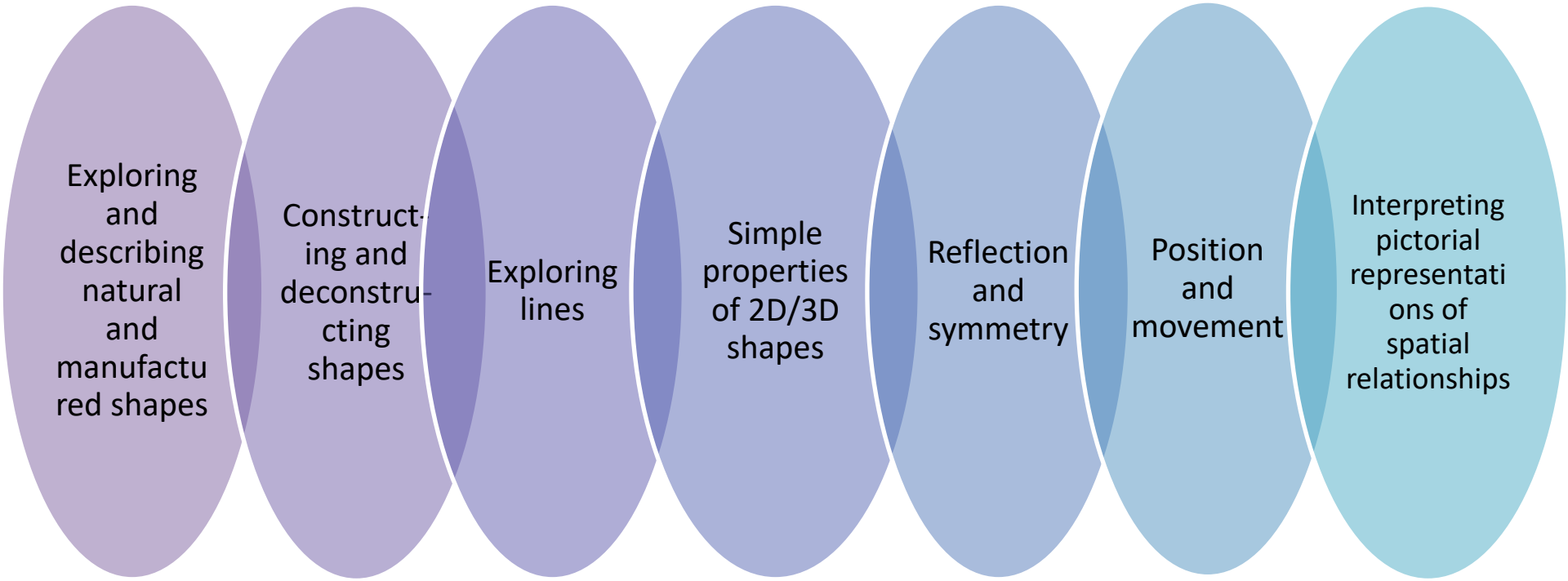


Orientation



Use of non-examples

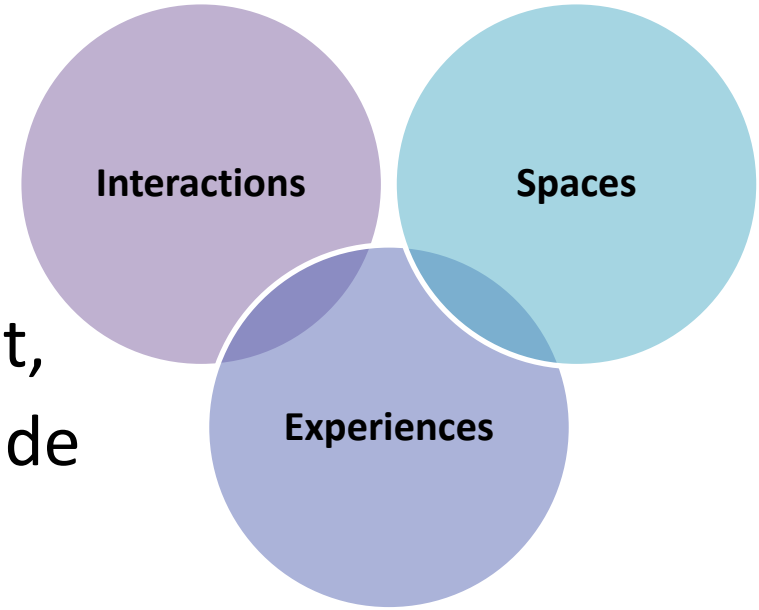
Key concepts of shape and space



Montague-Smith et al; (2012)
Mathematics in Early Years Education

Exploring and describing natural and manufactured shapes

It is important to support children to use familiar and unfamiliar language to describe and classify natural, manufactured and
self-made shapes and objects.



Consider the learning environment, how might you facilitate and provide for this?

Exploring and describing natural and manufactured shapes

Texture

- how does something feel? e.g, smooth, rough, hard, soft, bumpy, spikey etc.

Colour

Features

- make collections based on commonalities e.g., surfaces – flat/curved, solid/hollow shapes, lids/no lids, hole/no holes

Differences

- odd-one-out, discussion of why it doesn't belong develops understanding of difference

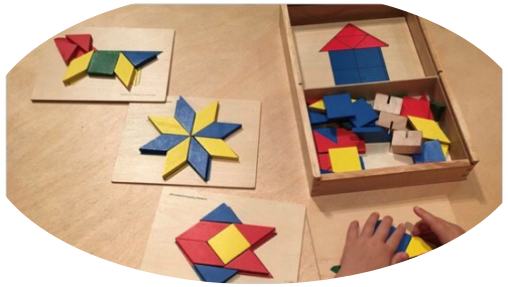
Size

- make comparisons e.g., longer/shorter, thicker/thinner

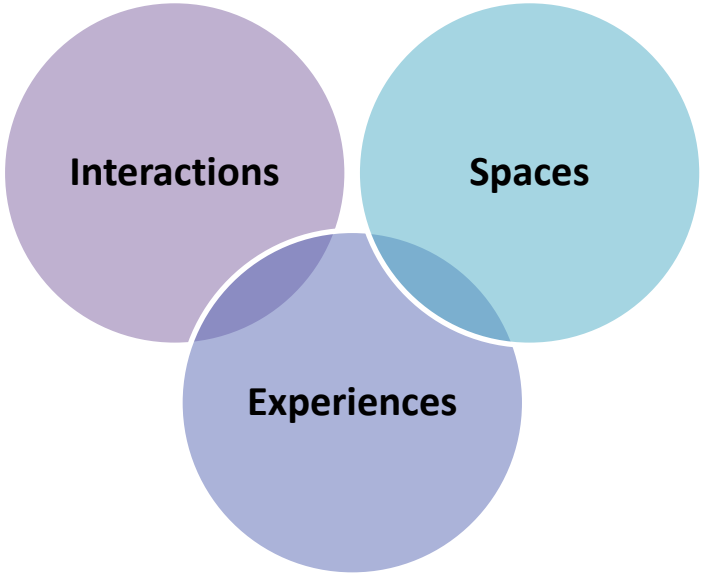
Constructing and deconstructing shapes

As children develop, they explore and become aware of how shapes fit together and new shapes are made.

- **Fitting shapes together**
- **Taking shapes apart**
- **Rearranging objects**
- **Reshaping objects**



Consider the learning environment, how might you facilitate and provide for this?



Exploring lines

"Exploring lines will provide understanding of the sides and edges of 2D and 3D shapes."

Montague-Smith et al; (2018)

Mathematics in Early Years Education

Line shape

- straight, zigzag, curved

Thickness

- thick, then, narrow, wide

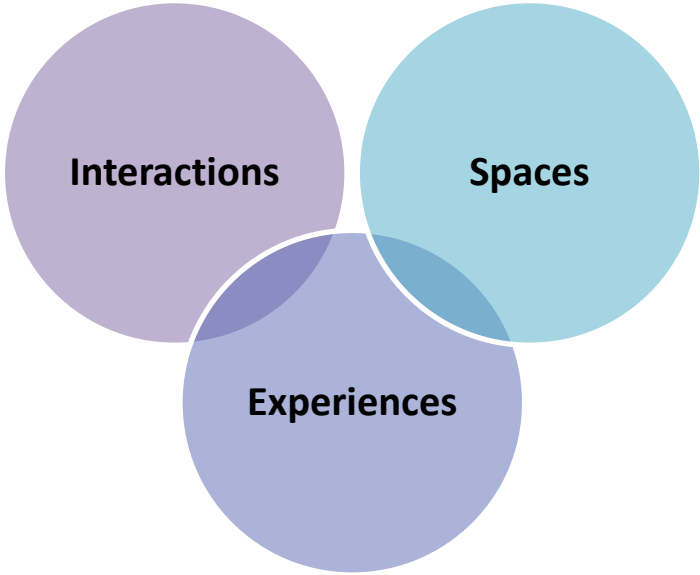
Outlines

- straight, bend

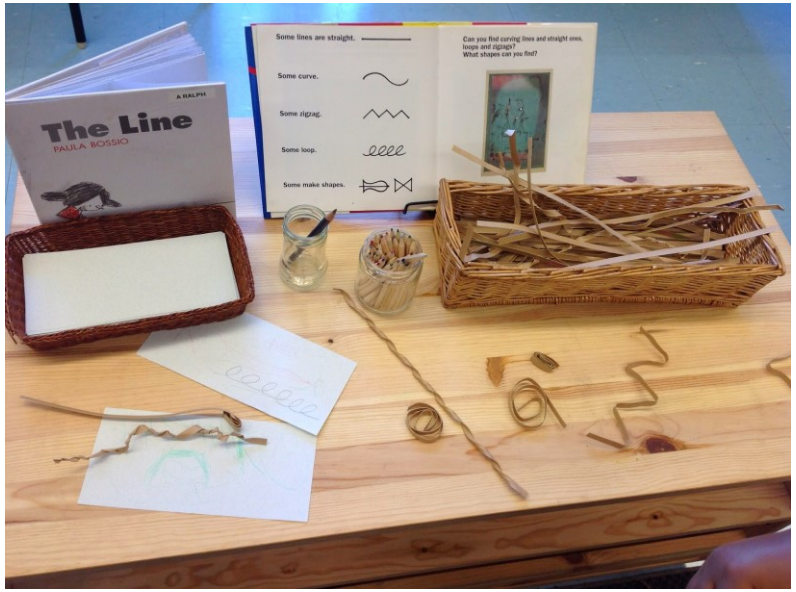
Direction

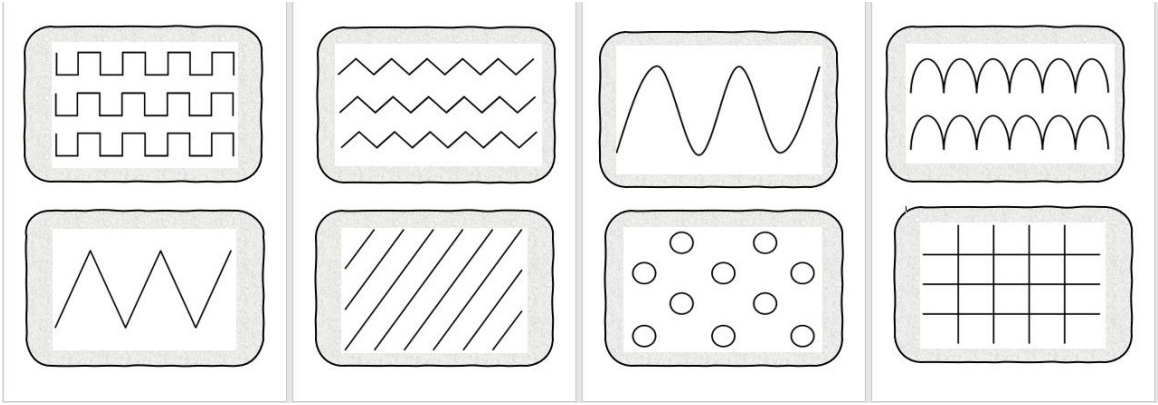
- forwards, backwards, turn, straight on

Consider the learning environment, how might you facilitate and provide for this?



Exploring lines





Simple properties of 2D shapes

Combining 2D shapes

- create recognisable pictures
- patterns
- tessellations

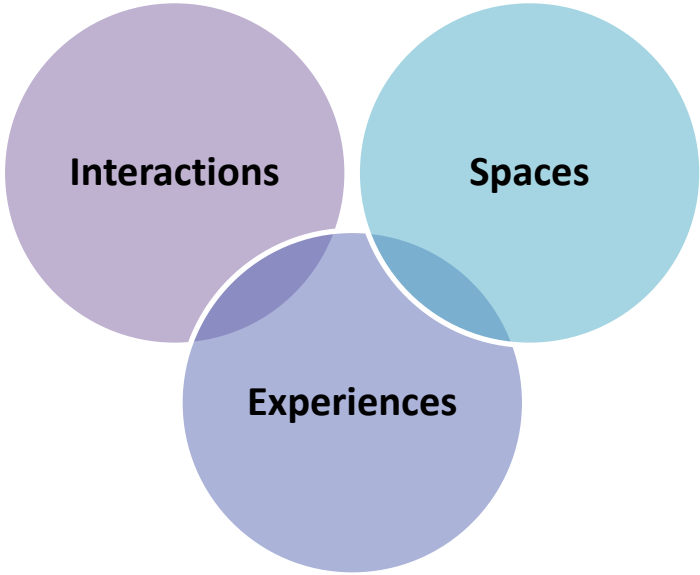
Sorting 2D shapes and naming them

- everyday and mathematical shapes
- make and discuss commonalities of sets

Faces of 3D shapes

- posting
- printing

Consider the learning environment, how might you facilitate and provide for this?



Simple properties of 3D shapes

Providing children with opportunities to sort and classify, fit together, take apart and rearrange/reshape objects will have involved their exploration of some properties of 3D shape.

Face shapes

- straight, curved, flat, points

Movement

- roll, slide

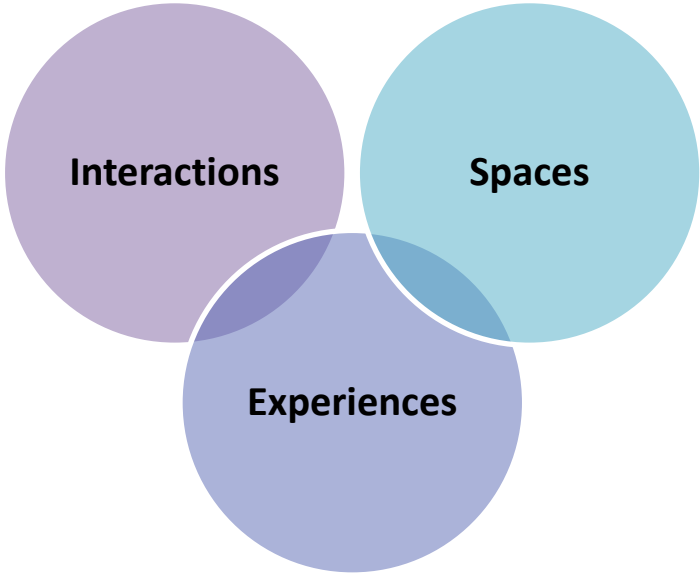
Arrangements

- stacking, fit together

Properties

- hollow, solid, nets

Consider the learning environment, how might you facilitate and provide for this?



Reflection and symmetry

"Pushing shapes into a posting box, placing shapes into a inset puzzle board and seeing their reflection in the mirror as themselves are all examples of experiences which children may well have had by the time they are 3 years old."

Montague-Smith et al; (2018) Mathematics in Early Years Education

Turning

- posting, inset boards, jigsaws

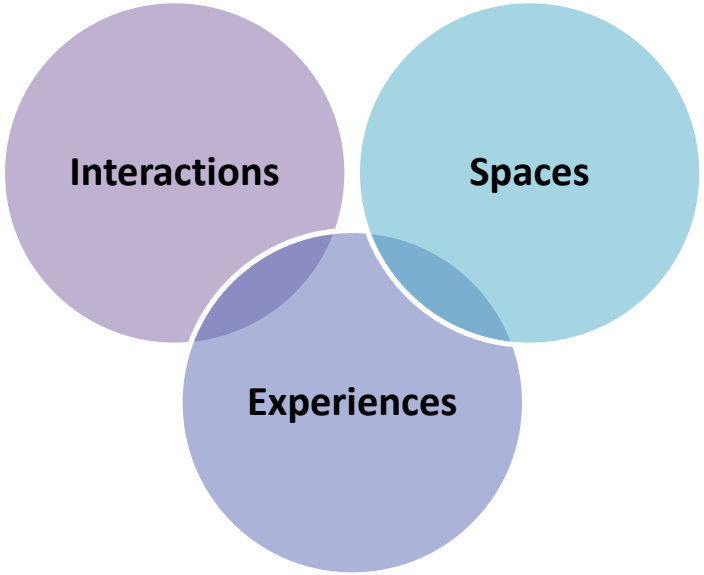
Reflection

- mirrors, 'sameness'

Making symmetrical patterns

- 3D constructions, 2D shape pictures, prainting/printing, paper folding

Consider the learning environment, how might you facilitate and provide for this?



Position and movement

Children need to be encouraged to develop the language of position and movement as the world around them changes as they take up different positions, move in different directions and change their body positioning.

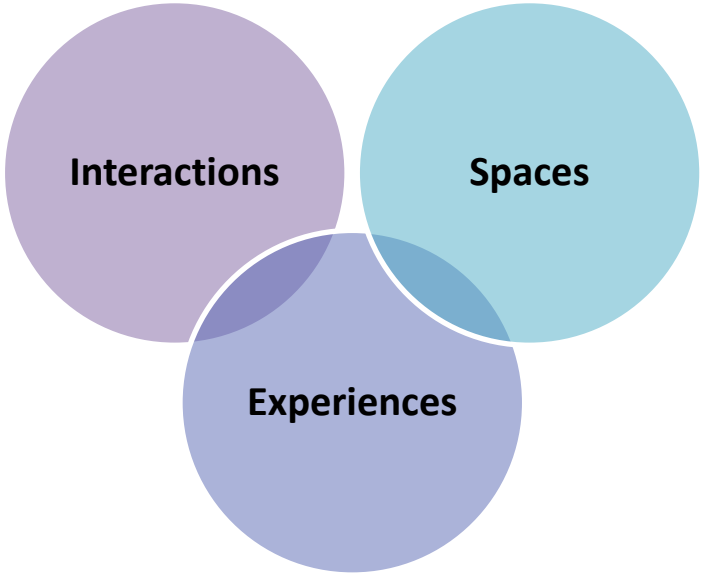
Observing and describing things from different viewpoints

- Usual and unusual positions, photographs, local walks

Relative positions, directions and distance

- on top, underneath, on, off, in front, behind, near, far, next to, beside

Consider the learning environment, how might you facilitate and provide for this?



Problem Solving

Construction

There are a number of natural opportunities to explore problem solving through block play, construction and model making:

Describe/draw plan of model/build they wish to create	Reflect on plan with adult support, where changes made and why
Describe how model/structure was created and why specific resources were chosen	Talk about what they would do differently next time

Puzzle Play

"Research shows that children who play with puzzles are better able to imagine what something will look like if it were changed."

Levine (2020);

Puzzle Play: An Easy Way to Boost Early Spatial and Math Learning

Deepen children's learning by finding and talking about spatial concepts that naturally occur from puzzles:	Feature of puzzle pieces e.g. short and curved, straight edge
	Describes spaces where puzzle pieces go e.g. 'this one needs a corner, a straight edge here and here.'
	Ask questions e.g. how do you know that fits there?
	Give clues and prompts e.g. 'I wonder what would happen if you turn it.'
	Use gestures as well as words e.g. point to the corners/edges

Learning Stories

Observations in action

In your groups:

- Read the learning story.
- Discuss and identify the learning.
- Discuss and identify possible next steps

Learner 1 - 4 years 12 months (June of pre-school year)

Today, Learner 1, you were playing with the Beebots in the block area. You were trying to make the Beebot go along the path that you had made with blocks. You continued to put instructions into the Beebot. When I asked you what way you wanted the Beebot to go you pointed ahead and said "*forward*". When you pressed go the Beebot went backwards instead and you said, "*no not back the way*." I spent some time with you showing you how to programme the Beebot and how to delete instructions to reset the Beebot ready for your instructions. When the Beebot reached a corner you were not sure about what way you wanted the Beebot to turn, left or right. You said, "*that way*", pointed using your right hand.

NOTICE AND NAEM THE LEARNING

What learning do I think is happening here?

POSSIBILITIES AND OPPORTUNITIES

What are the next steps?

Learner 1 - 4 years 12 months (June of pre-school year)

Notice and name the learning:
What learning do I think is happening here?

Today, Learner 1, you took an interest in using the Beebots in the block play area. You mapped out a path for your Beebot to move through. With support, you were able to give a set of instructions to the Beebot.. You used the language of direction such as 'forward' and 'back' and gestures to communicate which way the Beebot should turn. When the Beebot did not do what you expected it to you kept trying, well done!

Possibilities and opportunities:
What are the next steps?

We will give you more opportunities to develop the language of direction by creating obstacles courses for you and the Beebots to go through. We will also offer you some problems to solve such as, 'can you move the Beebot from the 'house' to the 'park'?' to help you predict where the Beebot will go.

Learner 2 - 4 years 12 months (June of pre-school year)

This week, Learner 2, you spent a lot of time at the painting and drawing table. You showed me that when you fold your paper over the colours go onto the other page, you said, "*look it's the same*". I told you that this was called symmetry, when one side is the same as the other. You then started creating lots of different pictures using the same process. I had a go at making my own picture and fol way. You watched with interest and had a go as well.

NOTICE AND NAEM THE LEARNING

What learning do I think is happening here?

POSSIBILITIES AND OPPORTUNITIES

What are the next steps?

THE SCOTTISH ATTAINMENT CHALLENGE
LITERACY NUMERACY HEALTH & WELLBEING

Glasgow CITY COUNCIL

Learner 2 - 4 years 12 months (June of pre-school year)

Notice and name the learning:
What learning do I think is happening here?
This week, Learner 2, you playfully explored the paints that were on offer. You created a number of symmetrical pictures, recognising that each side of the paper was the 'same'. I introduced you to the word 'symmetrical' and showed you different ways of folding your paper to create more pictures with one line of symmetry. You had a go and took pride in showing me your creations.

Possibilities and opportunities:
What are the next steps?
We will give you more opportunities to explore symmetry by looking at pictures and objects in the environment for example, butterflies and windows of houses. We will also explore symmetry in other ways using loose parts and mirrors. Did you know when you look in the mirror that is creating a symmetrical picture of you!

Assessment

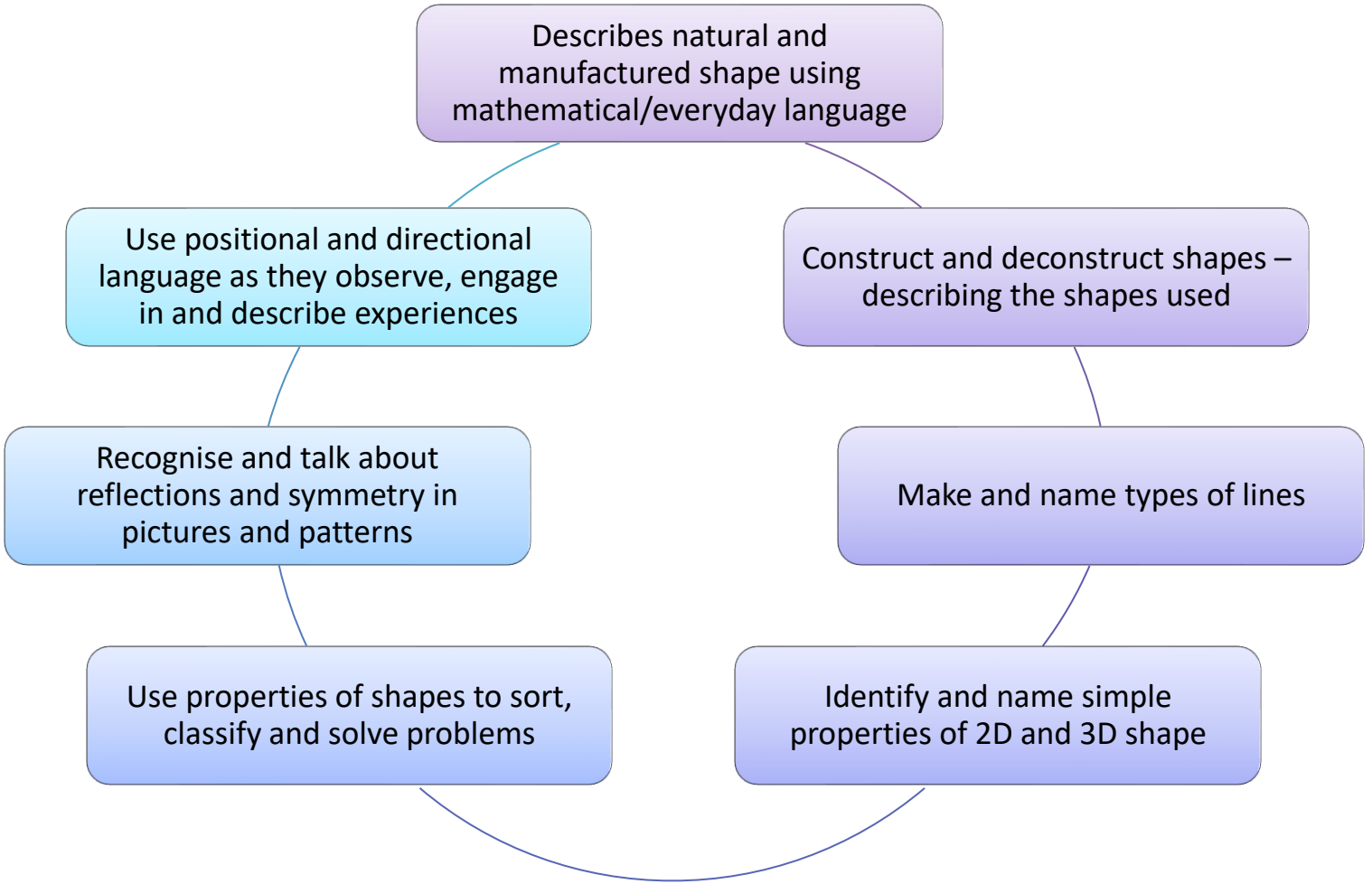
Assessment opportunities may come from:

- children's physical exploration of shape and space concepts
- children's use of associated mathematical language.

Children will benefit from:

- hearing adults using the language of shape, position and movement consistently through incidental and spontaneous play opportunities and intention learning experiences.

Assessment


Describes natural and manufactured shape using mathematical/everyday language
Use positional and directional language as they observe, engage in and describe experiences
Construct and deconstruct shapes – describing the shapes used
Recognise and talk about reflections and symmetry in pictures and patterns
Make and name types of lines
Use properties of shapes to sort, classify and solve problems
Identify and name simple properties of 2D and 3D shape

Effective Interactions and Questioning

What is the same/different about these?

Which pieces fit together? Could you fit them together in a different way?

How could you make the Beebot go to the____?

Can you describe this shape and your friend can try and guess what it is?

Which shapes do you think will roll? How could we find out?

What can you see in the picture? Where is the ___?

Montague-Smith et al; (2018)
Mathematics in Early Years Education

Shape and Space Carousel

Have a go…

In groups, look at the resources on your table and discuss how you could use these to explore the pattern concept and provide a planned learning experience:

- Identify the learning intention and success criteria for your planned experience (remember to refer to the E's and O's and benchmarks (and frameworks) to support.

- Consider the developmental progression, how could you differentiate, providing challenge to some learners?

- Plan for quality interactions, what questions might you ask? What language will you use?

Shape

I enjoy investigating objects and shapes and can sort, describe and be creative with them.

MTH 0-16a

Benchmark statements:

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

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

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

Benchmark statements:

- 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.

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

Shape and Space Carousel

Feely bag

Line printing

Mirror symmetry

Playdough

Beebot and block

Possible explorations

Possible Explorations

Artist Exploration

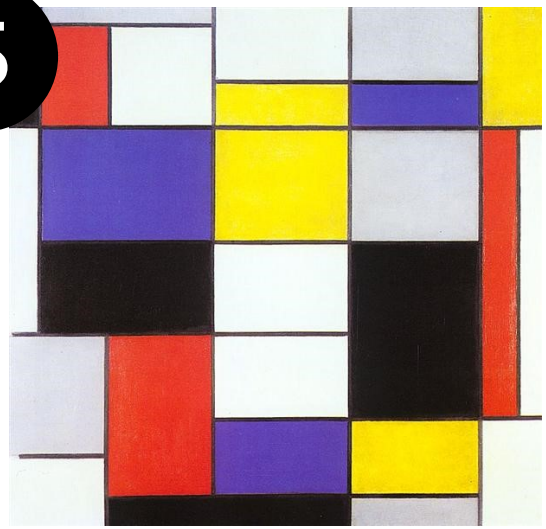
1

2

3

4

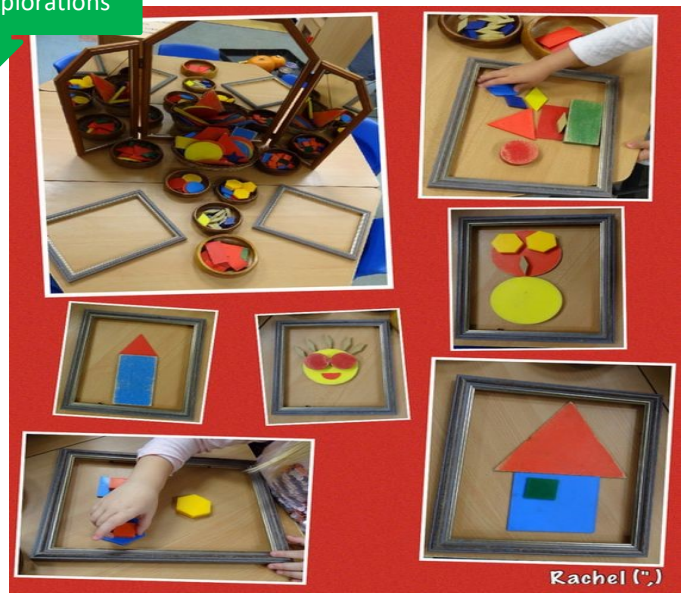
5

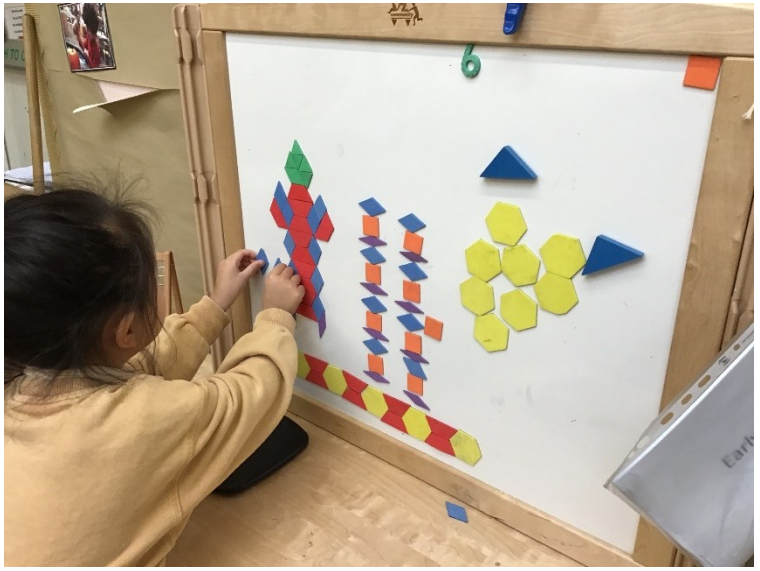


https://www.tate.org.uk/kids/explore/who-is

Possible Explorations

Possible Explorations





Possible Explorations

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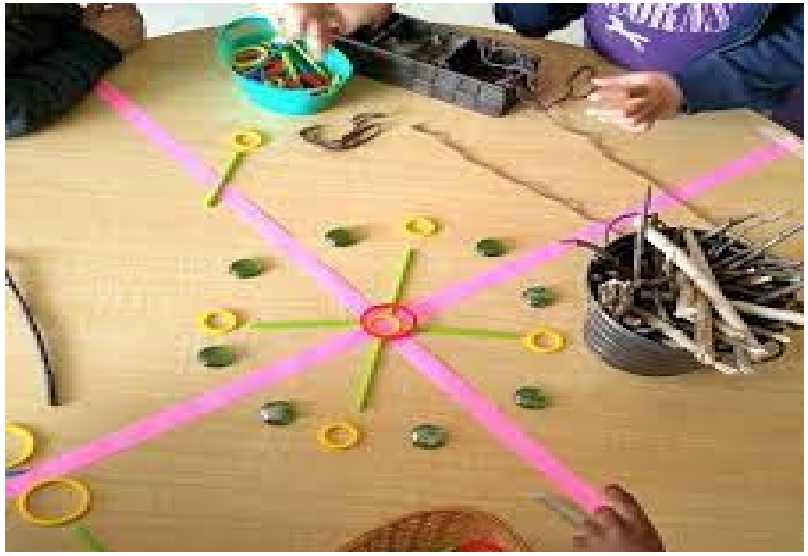

Glasgow Counts in our Playrooms
Shape and Space

THE SCOTTISH ATTAINMENT CHALLENGE
LITERACY NUMERACY
HEALTH & WELLBEING

Glasgow's Improvement Challenge
Unlocking Learning

Professional Learning gtc SCOTLAND 2018 EXCELLENCE AWARD

LPA Year 2