Role Play

Whether you have a dedicated area for inspiring role play that changes and develops with the children's ideas, a home area or role play extends across your provision, role playing will provide children with rich and varied opportunities to apply developing mathematical ideas and practice using mathematical tools.

Characteristics of effective teaching and learning

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

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

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

Mathematical learning

Area:	What you might see:
Problem Solving	Sets and perseveres with problems e.g. "Can we have a car boot sale?" "How can we work out how much things cost?" "I don't want to pay that for the jug - the cups are only 20p." "How much will two of those be?" "How much change will I get?"
Reasoning	Thinks through possible outcomes e.g. "If we want to know the bus time, we need to look at this timetable." "If we want the right number of plates, we need to count the people."
Measures	Plays with clocks, money, timetables and measuring tools with knowledge of how they work, e.g. "We need to weigh the flour and butter to mix my birthday cake." "I'm the doctor, I need to measure your temperature." "My appointment time was 10 o'clock, I'm late!"

Adults might …

Step back and observe children's open-ended play.
What are they showing us?
What are they thinking about?
What are the possible links to mathematical learning?

Play alongside, working with the children, following their lead.
Model your thinking out loud e.g., "If I buy this, I am wondering if I have enough left to buy that too…" and participate in sustained shared thinking. Pose 'What if…?' questions e.g. "What if we… wanted to open a café?" "… measure our feet for those shoes?" "…used these scales to bake mud cake?"

Guide play to extend learning, modelling key vocabulary and language.
Set a challenge e.g. who can work out how much I owe you? Who can make a poster with the opening times?

Analyse what you see and consider next steps.
How will this inform future planning and teaching? For example, money.

Look for progress in…

Children's stamina and perseverance in their play.

Children revisiting and using their previous learning.

Children using and applying knowledge and skills from other areas of the curriculum e.g., geography, history and English.

Have a go…

Core Resources:

- Open-ended resources e.g. fabrics, cushions, curtains, large card/dividers etc.
- Furniture, pallets or platforms
- Coins, notes and bank cards.
- Any topic-specific resources e.g. stamps for a post office.
- Badges to indicate roles e.g. stall holder

Enhancements:

- Magazines and TV times
- Timetables
- Working clocks – analogue and digital
- Ideally space for a shop/café etc as well as a 'home'
- Measurement resources e.g., rulers, tape measures, scales
- Calculators, laptops and mobile phones, phone books, pad and pens
- Dressing up clothes

Key vocabulary: As the role play area can transform into almost anything, the key vocabulary possibilities are endless. For example, in a shop you may focus on language of value and exchange of money.

Block Play

This works best with a set of wooden unit blocks but can be adapted to whatever you have available, such as unloved blocks at the bottom of a cupboard. This area will provide children with ample opportunities to learn and discover.

Characteristics of effective teaching and learning

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

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

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

Mathematical learning

Area:	What you might see:
Problem Solving	Sets and perseveres with problems e.g. "How build a ceiling for my model?"
Reasoning	Thinks through possible outcomes e.g. "If you put that there, it's not going to balance any more!"
Pattern	Selects and explores blocks for a specific purpose e.g. "I need this block here to match."
Ratio & Proportion	Recognises connections between unit blocks e.g. "I need more big blocks…. Maybe I can use two little ones instead."
Geometry	Predicts and rotates objects to fit the space e.g. "Flip it! Flip it!"
Measures	Makes and discusses length and height comparisons, paying attention to accuracy e.g. "It needs to be downer!" "One more block and it'll be taller than me"

Adults might …

Step back and observe children's open-ended play.
What are they showing us?
What are they thinking about?
What are the possible links to mathematical learning?

Play alongside, working with the children, following their lead.
Model your thinking out loud e.g., "What about using these blocks to make a staircase/ceiling?", Participate in rich discussions and sustained shared thinking. Pose 'What if…?' questions and "I wonder" statements e.g. "What if we wanted to make this reach across this road/river?" "I wonder what would happen if we tried to fit this tractor under this bridge, rather than just the cars?"

Guide play to extend learning, modelling key vocabulary and language.
Set a challenge e.g. who can build the longest bridge? Who can build a tower taller than their friend?

Analyse what you see and consider next steps.
How will this inform future planning and teaching? For example, position and direction.

Look for progress in…

Children's stamina and perseverance in their play.

Children revisiting and using their previous learning.

Children using and applying knowledge and skills from other areas of the curriculum e.g., geography, history and English.

Have a go…

Core Resources:

- A good amount of floor space, on a hard surface, indoors or outdoors
- Ideally, a high-quality set of wooden blocks in various shapes & sizes
- A clear storage solution e.g., shadowing on a shelf
- Space to display finished models
- Drawing/writing material e.g., clip boards with paper and pencil attached

Enhancements:

- Fiction and non-fiction books about buildings/structures/designers
- Pictures of buildings, bridges, towns etc. for inspiration
- Small world toys/characters/scenes to encourage open-ended play
- Loose parts resources
- Measurement resources e.g., rulers, tape measures
- Wooden train set

Key vocabulary:

- Cube, cuboid, cylinder and other shape names
- Rectangular, circular
- Outside, inside, in front of, opposite and other positional language
- Similar, different
- Taller than, much longer than …
- Wide, narrow
- Level, sloping
- Steep, shallow
- Curved, straight
- Stable, unstable
- Centre
- Route

Creative

This area offers multiple opportunities for mathematical conversations, for example how things fit together, or which shape represents the creature they have in their head. This works best when the area is well organised and children are responsible for its upkeep. They should have access to a wide range of materials of different shapes, sizes and textures.

Characteristics of effective teaching and learning

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

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

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

Mathematical learning

Area:	What you might see:
Problem Solving	Planning, making and testing e.g. making a boardgame.
Reasoning	Thinking through possibilities and selecting resources. Intentionally selecting shapes to fit their purpose e.g. when making a family of robots: "This one is the baby one, for his legs I chose the long, thin small boxes."
Pattern	Selecting and exploring resources e.g. placing different shaped and coloured bobbles to create a repeating border pattern around a card, paying close attention to the little bit (the unit) that repeats..
Ratio & Proportion	Beginning to develop an understanding of ratio e.g. mixing powder paint for the week ahead. Ensuring the correct amount of water to paint to create the desired consistency. "It's hard to mix it, I need a bit / lot more water."
Geometry	Placing and arranging objects, selecting appropriate shapes for their project or design e.g. "This shape is more pointy, so it is perfect for my rocket top."
Measures	Comparing length and height paying attention to accuracy e.g. making beds for the three bears or making letters to fit in envelopes. Exploring measuring tools such as tapes.

Adults might …

Step back and observe children's open-ended play.
What are they showing us?
What are they thinking about?
What are the possible links to mathematical learning?

Play alongside, working with the children, following their lead.
Model your thinking out loud e.g. "I want to make a crocodile. I need lots of small triangles for the teeth.", participate in rich discussions and sustained shared thinking. Pose 'What if…?' questions and "I wonder" statements e.g. "What if we folded this in half? Would it fit in the box?" "I wonder how I would make a vase for these flowers."

Guide play to extend learning, modelling key vocabulary and language.
Set a challenge e.g. "Can you make a parachute for this egg?" "Can you make sure your parachute lets your egg land with no cracks?"

Analyse what you see and consider next steps.
How will this inform future planning and teaching? For example, measures.

Look for progress in…

Children's stamina and perseverance in their play.

Children revisiting and using their previous learning.

Children using and applying knowledge and skills from other areas of the curriculum e.g., geography, history and English.

Have a go…

Core Resources:

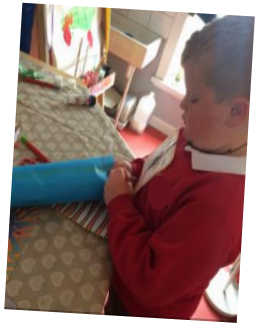
- A range of good quality pens, pencils and crayons
- Pencil sharpeners
- Scissors
- A selection of different paper
- Glues and spatulas
- Different tapes and a sticky tape dispenser
- Fasteners e.g. paper clips, treasury tags, split pins
- String, wool, ribbon, fabrics
- Hole punch
- Pipe cleaners
- Junk materials

Enhancements:

- Fiction and non-fiction books
- Pictures to prompt thinking
- Annotated photos of children using the area
- Clay and tools
- Paper trimmer and stapler
- Seasonal/special occasion resources
- Measuring tools e.g. rulers and tapes
- Haberdashery items e.g. braids, buttons
- Mechanical items that are or can safely be taken apart for their components e.g. watches and clocks (excluding batteries)
- Recycled cards and postcards
- Small off cuts of wood

Key vocabulary:

- Sort, classify and group
- Taller than, smaller than, fit inside and other language of size, shape and measure
- In, on, under, above, beside and other positional language
- Unit of repeat, continue, follow, alternating and other language of pattern.
- Language of sequencing e.g. first, second, then, last.
- Language of quantities e.g. "I need three more of those"



Small Construction

This works best with a large quantity of different resources which join together and connect such as Brio Builder or K'NEX. This area provides children with opportunities to develop spatial reasoning on a smaller scale. Remember to check the backs of cupboards and rainy-day boxes for additional extra items to add to collections.

Characteristics of effective teaching and learning

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

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

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

Mathematical learning

Area:	What you might see:
Problem Solving	Selects appropriate materials for specific goals e.g. comparing lengths accurately for a robot's legs or choosing to attach their spider legs symmetrically.
Reasoning	Interprets diagrams and plans instructions to support what they want to make.
Pattern	Makes and recognises symmetrical, growing, or repeating sections within their larger designs and models.
Ratio & Proportion	Creates bigger and smaller versions of designs and models, or smaller/larger sections and units in their design.
Geometry	Visualises what they want to make, is able to describe it and selects shapes and sizes appropriately
Measures	Makes and discusses size comparisons, paying attention to accuracy.
Number	Recognises and estimates the number of items needed to create their intended design. Discusses comparisons of quantities used.

Adults might …

Step back and observe children's open-ended play.
What are they showing us?
What are they thinking about?
What are the possible links to mathematical learning?

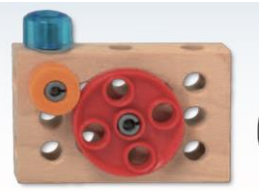
Play alongside, working with the children, following their lead.
Model your thinking out loud and participate in rich discussions and sustained shared thinking. Pose 'What if…?' questions and "I wonder" statements, including posing problems in story contexts, e.g. "What if we wanted to make this double the size?"

Guide play to extend learning, modelling key vocabulary and language.
Set a challenge e.g. who can build the machine that rolls down the hill the fastest? Can you build a bridge for this new and wider carriage?

Analyse what you see and consider next steps.
How will this inform future planning and teaching in, for example NC Geometry?

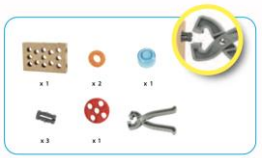
Look for progress in…

Children's stamina, focus and perseverance in their play.



Children revisiting and using their previous learning.

Children using and applying knowledge and skills from other areas of the curriculum e.g. science, art and geography.



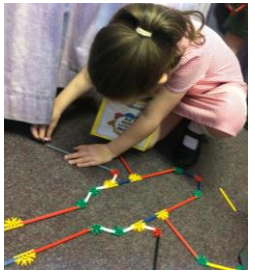
Have a go…

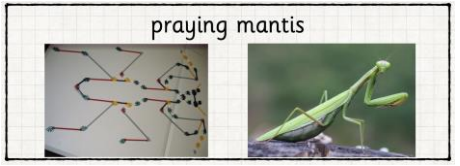
Core Resources:

- A good amount of floor space
- Various small-construction sets where items join and fix together e.g. Brio Builder and K'NEX
- Specific mathematical resources such as multilink, polydron, clixi and geo-strips
- A clear storage solution e.g. labelled and sorted transparent boxes
- Space to display part- and finished models

Enhancements:

- Pictures to inspire ideas e.g. animals, machines, vehicles.
- Instructions for models made with the construction sets you have.
- Resources for children to make their own instruction cards.
- Measurement resources e.g. rulers, tape measures
- Tablet or camera to take photos of models from different angles.
- Clipboards.





Key vocabulary:

- Estimate, roughly, enough
- Longest, longer than
- Shortest, shorter than
- Furthest, further than
- Area
- Centimetre
- Symmetrical, line of symmetry, reflection
- Opposite, beside, between, centre
- Unit of repeat
- Shape names
- Curved, straight
- Edge, side
- Surface

Snack

Whilst snack is not always continuously available and may not often be as child-led, snack is a common event in KS1 classes and is often under-estimated in terms of those daily opportunities to practice and develop children's mathematical knowledge of, for eg, fractions, data handling, sharing, time and money.

Characteristics of effective teaching and learning

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

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

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

Mathematical learning

Area:	What you might see:
Problem Solving	Discussing, recording and analysing problems relating to their snack time e.g. has everyone had their fair share? How do we know?
Reasoning	Offering solutions to problems of not enough or fairness by weight, volume or number.
Number	Estimating if we have enough of something. Working out how to share out all the orange pieces, or how to share 10 apples between 15 children, for example.
Statistics	Voting for favourite snack of the day/week (for example a tally chart, pictogram using objects etc.)
Ratio & Proportion	Fair share and fractions when distributing quantities or cutting up items for sharing.
Measures	Comparing amounts: Children focussing on pouring the same amount of water in everyone's cup; or discussing how much different water bottles hold

Adults might …

BEFORE

Consider the different ways of organising snack

Whole class? Small group? Café style? Stop and snack?
What are the possible links to mathematical learning?

DURING

Plan for adult involvement alongside snack

Model your thinking out loud e.g. "How many pieces of snack do we have today?" "Do we need to cut up this apple?" "How shall we do this fairly?" These rich discussions lead to sustained shared thinking. Pose 'What if…?' questions and "I wonder" statements e.g. "What if not all of us like orange?" "I wonder if we have enough bananas for everyone to have some?"

Guide discussion to extend learning, modelling key vocabulary and language.

Set a challenge e.g. "What if we wanted to find out what our favourite snacks are?" "I wonder how we could keep a record of that?"

AFTER

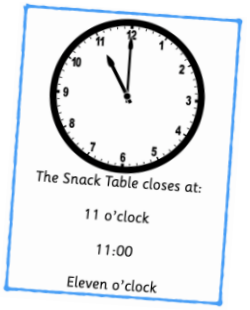
What do you notice about what children know about…

fractions? …estimating… comparing amounts… collecting and reading data?

Look for progress in…

Children applying revisiting and using their previous learning and knowledge (of comparing amount, fractions, sharing etc.) in this context.

Children having their own ideas about how to organise snack time or how to decide what to have for snack.



Have a go…

Core Resources:

- Provide a quiet area with table and chairs, hand-washing and washing-up facilities, plates, knives, cups, jugs etc.
- If operating ongoing 'stop and snack', create a system for monitoring who has and who has not had snack and use as an opportunity for statistics learning. Can the children organise this?
- If operating café style, consider how the different groups will be organised and timetabled? Once established, can the children monitor this?

Enhancements:

- Can we make fruit kebabs today for everyone?
- You are can have 50g/a paper cup worth of fruit, which fruits will you choose?
- Can you make a repeating pattern with your fruit?
- You have 10 counters to 'pay' for your fruit today - here are the prices for the different snacks. What will you choose?
- What if we had sandwiches one day?
- Voting for favourite snack of the week or choice of next week's snack
- Researching the cost of snack items and budgeting

Key vocabulary:

- Enough, estimate, how many (more), share equally, one/two.. each, fairly,
- calculate, spend, full, roughly, exactly, count in 2s, equal to, least/most, too few, just over,
- nearly time for
- half, quarters, eighths,
- middle, arrange
- predict, explain, work out, check,
- tally, vote, list, most/least popular

Outdoor Learning 1: The Mud Kitchen

All children in Key Stage 1 require access to outdoors, to be able to use this for mathematical learning. Core resources can be stored to be carried outside if continuous access is not possible.

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

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

Mathematical learning

Area:	What you might see:
Problem Solving	Sets and perseveres with problems set e.g., reads and creates 'mud pie' recipes, stipulating amounts of mud and water and accurately measures these out.
Reasoning	Thinks through possible outcomes e.g., if I add more water, it will be easier to pour.
Pattern	Selects and explores pattern using natural resources e.g., collects petals, leaves, twigs, stones to decorate a birthday cake, paying attention to placing and arrangement.
Number, Ratio & Proportion	Counting and estimating amounts for recipes. Begins to develop an understanding of proportionality: "We need more mud than water to make a proper cake".
Geometry	Organising and reorganising their own storage solutions, paying close attention to size and shape.
Measures	Using different containers in terms of capacity and volume, e.g. deciding which containers are best for transporting water to fill a large tub and comparing amounts of water in similar containers.

Adults might …

Step back and observe children's open-ended play.
What are they showing us?
What are they thinking about?
What are the possible links to mathematical learning?

Play alongside, working with the children, following their lead.
Model your thinking out loud and participate in genuine discussions and sustained shared thinking. Pose 'What if…?' questions and "I wonder" statements e.g. "I wonder what the consistency of this milkshake will be, thicker or thinner than this one?"

Guide play to extend learning, modelling key vocabulary and language.
Set a challenge e.g. If we made another batch of perfume, will it smell the same? What would we need to do to make it smell the same?

Analyse what you see and consider next steps.
How will this inform future planning and teaching in, for example, measures?

Look for progress in…

Children predicting outcomes and testing assumptions.

Children's attention to accuracy and willingness to estimate.

Children working collaboratively and sharing ideas.

Have a go…

Core Resources:

- Buckets & spades
- Pots and baking trays
- Cooking utensils
- A range of small and large containers
- Clip boards with paper and pencil attached
- Pipes/guttering
- Planks
- Pallets
- Ropes and string
- Chalk and boards
- Items that stack
- Tape measures
- Timers
- Pegs and clips

Enhancements:

- Seasonal resources e.g. buckets & spades for snow
- Open ended playground markings e.g. a long track
- Materials to make signs e.g. for traffic
- Running water
- Maps
- Tyres
- Recipe books/chalkboard for recipes
- Fiction books e.g. Mud Pies and Other Recipes by Marjorie Winslow, Pumpkin Soup by Helen Coope
- Pull along trolleys/wheelbarrows for transporting large materials such as logs
- Colourings, essences, herbs and spices to mix & grind
- Measurement resources e.g. scales, jugs, timers.

Key vocabulary:

- Unit
- Weight, grams, kilograms
- Litre, half litre, millilitre
- Equivalent to, nearly as much as, just enough
- Half full, empty, full
- Level
- Exactly the same
- Design
- Texture
- Symmetrical
- Repeating
- Horizontal, vertical