

GETTING *constructive* WITH **MATHS**

Carole Skinner explains how practising construction skills can give children a solid foundation in numeracy...

Young children love designing, making and building things, and they learn a lot of maths through working with construction materials. Inspiring their constructional play and mathematical creativity can be as simple as providing a well-resourced construction area and some thought-provoking building ideas and activities. And it's not only maths skills children are developing when they're working together and sharing the process of building a house or a bridge, or being pleased with a model they've made; it all does wonders for their personal and social development too.

What do you need?

Your construction area should offer children a place for them to explore, investigate and use a range of building materials. There are small changes you can make in your construction provision and organisation that will have a big impact on children's access to maths ideas.

Try setting up a 'tinker table' with small, fiddly pieces of equipment such as nuts and bolts, washers and other small things that can be taken apart. Supply materials that enable children to practise different manipulative skills and use words such as twist, screw, push, pull and turn. Include shapes that fit together and everyday items such as plastic cups that stack up inside each other and sweet tubes that don't.

Make sure there are construction resources



located both indoors and outdoors. Indoors, provide construction sets that develop small motor skills, with table modelling and glue and paint, cardboard boxes and cylinders. Introducing small world people, farm and jungle animals or cars will encourage story making and give children the opportunity to use maths language. You could ask children to explain how many different types of cars there are in the garage they made and how many there are altogether.

Outdoors, where everything is on a much larger scale, use big construction materials. These invite children to build as a team and engage them in talk and co-operative play. Of course, children will need time to investigate the boxes, climbing inside and sitting on top before they begin a major construction. Add camouflage netting and silver foil survival blankets to help give a realistic effect to built caves and dens.

Resource a box with natural materials and encourage children to make constructions for a real purpose: sticks to make a framework for the beans to grow up, twigs and clothes to make scarecrows, and stepping stones and pebbles to construct pathways, as well as the usual houses, castles and tower builds that are part of children's play.

Where's the maths?

Working with construction materials gives children the opportunity to develop their maths understanding by talking, using number language, exploring shape and space, estimating and measuring, making predictions and recording results.

The maths learning is focused on counting,



calculating, shape and the language of measurement – how big, how wide, how long a model will need to be, or how tall a construction actually is, with children getting a feel for the appropriate sizes and a purposeful context for measuring.

Sorting for a purpose occurs quite naturally as children choose the recycled materials that they want to build with or collect together all the red plastic bricks they need to make a house. You can encourage sorting by suggesting they categorise some of the building materials into separate boxes and let them decide on the appropriate categories, such as the 'wooden cylinders' or 'not very good for building shapes'.

You can support children by using positional language, for instance, words such as 'behind', 'in front of' and 'next to' when you're talking about their constructions. Offer children shape and space words so that children can describe their buildings and say what they used to build them.

Finally there's always a focus on solving problems in construction play. Children visualise the shape they'll make if they glue some boxes together. They decide how many wheels they need or work out how much material they want. Children talk about what they're doing, develop and test ideas and record in different ways.



Taking Stock

DO A RESOURCES AUDIT AND TICK OFF THESE 'MUST HAVE' CONSTRUCTION MATERIALS...

- Two or three different sorts of plastic construction sets
- Soft play sets of 3D shapes which are portable and versatile
- Big chunky wooden building blocks
- Large wooden blocks for outdoor play
- Small wooden bricks with a range of different shapes
- Large plastic building bricks
- Construction kits, interlocking bricks, sets with connectors, cogs, screws and bolts
- A selection of boxes, crates, gutters and planks
- A workbench for using wood, hammers, saws and nails
- Hard hats and safety goggles
- A constant supply of recycled boxes, curtains, sheets and nets
- Glues, staplers, hole punchers, duct tape, bulldog clips, clipboards

The equipment needs to be organised in boxes or crates (preferably wheeled), labelled with both picture and prints. Add maths to the labels by writing '10 wheels' and '20 very large blocks' as well as naming the shapes that are in the box.



Construction materials offer endless opportunities for playing and learning new maths skills. There's always a focus on solving problems, too.

CAROLE SKINNER

What's the adult's role?

- Building alongside, extending the child's knowledge by adult commentary, offering new materials and extra resources, modelling building skills.
- Suggesting counting or recording ideas or adding measuring equipment. Helping children to experiment with different materials.
- Listening in and commenting on conversations where children describe and compare the properties of their constructions, and providing mathematical vocabulary: "Ela's tower is taller but Jack's is wider", "Theo's bridge is longer than the truck" etc.
- Showing the children how to use safely small hand tools such as hammers and nails.
- Discussing with the children the building materials and talking about how they might be fixed together. With guidance from the child offering restrained support with cutting, sticking and hole punching.
- Modelling cutting down the side of a 3D

box to see what 2D shape it makes. This helps children to find out how things are put together or work together. You can also then turn the box inside out, as the plain side is easier to paint on when the box is reformed.

- Gathering together plastic milk crates, cardboard boxes, tarpaulins, blankets, sheets and curtains so that all the children building dens can be part of the construction curriculum on offer. Add role-play clothes to the construction area and make sure that the builder's hats are not all yellow (you can buy some very nice pink ones now to encourage any reluctant girls to start constructing!).
- You'll be able to observe the negotiating and discussion that occurs when the children are sharing the wheels or the woodwork tools or building a den, as well as the instructions they give each other and the vocabulary they use. Note also the opportunities children have for demonstrating and respecting and taking

care of others' constructions – e.g., not knocking down or pulling apart someone-else's castle or bridge!

What sort of recording should there be?

- Put together an interactive display of constructions where children can add to the display and contribute ideas and comments.
- Provide reasons for writing by putting clipboards in the construction area for children to list or draw what materials they need or used, and record their ideas.
- Supply zigzag books for those who want to write instructions for others to make the construction.
- Emphasise the outline shape of a construction by making a photocopy of the construction. Use a blanket to cover the screen if the photocopier won't close.
- Tape record children interviewing each other about how they made the castle. Put a copy in the listening centre labelled 'Come and listen to "How to build a castle"'.
- Observe and take photos of children playing with construction materials and use as an entry in their learning journal – and as a starting point for planning their next maths based learning activities.



10

construction challenges for kids

INSPIRE CHILDREN WITH THESE EXCITING BUILDING PROJECTS. EACH ONE WILL ENCOURAGE A PROBLEM SOLVING APPROACH....

- 1 How tall can you build a tower before it falls down?
- 2 Can you completely cover the table top with bricks?
- 3 Is it possible to build a wall with a window to look through?
- 4 Put a box inside a box inside a box inside a box....
- 5 What can you build using 10 bricks?
- 6 What can you build using different sized cuboids?
- 7 Make a bed for a teddy
- 8 Use the crates to make a den for superheroes
- 9 Build a bridge strong enough for the toy tractor to drive across.
- 10 Make a house for a mouse



Born to build

HELP CONSTRUCT A STRONG UNDERSTANDING OF MATHS WITH THESE RESOURCES...

Block party

These soft, washable blocks feature stimulating textures, colours, shapes and sounds, all geared towards developing sensory skills. Light-weight and easy to grab, count and stack, they're ideal for early years construction projects. Visit tts-shopping.com or call 0800 318 686.



A-maze-ing!

Children can build number recognition and practise counting whilst fine-tuning their motor skills with this fun magnetic maze. Use the wand to move balls around and drop them into each gumball machine! Call 0113 270 7070 or visit ascoeducational.co.uk