



Making foot prints

Exploring 3D shapes

NRICH



Children enjoy making footprints in soft materials..

Adults could use this idea to encourage children to participate in 3D shapes and develop an awareness of the shapes of their faces

The Activity

Provide children with soft dough, and a selection of small wooden blocks of various shapes. Talk about experiences of making footprints in sand or snow. Encourage children to select a block and to press it into the dough, making a 'footprint'. Show how to run a finger around the edge of the impression to feel the

Encouraging mathematical thinking and reasoning.

Describing

Tell me about what you've made.
Can you see other blocks that might make the same footprint?

Recording

Draw around a block. Look at the shape you have made.
Is it the same shape as the "footprint"?

Reasoning

What will happen if we stand the shape back in its footprint?
How do you think this . . . shape made this footprint?

Opening out

Try printing with the different parts ends of this shape.
How many different footprints do you think you can make with this shape?
Which shapes might have made this footprint?

Resources

- Soft dough
- Selection of wooden blocks of various shapes,
- Rolling pin to "re-flatten" the dough,
- Camera or video camera for recording results.

The Mathematical Journey

Properties of 3D shapes, describing the shape of each block using simple language; flat, sharp, slopey, pointy, like a brick, ball, box, roof etc. Talking about the way in which the shape behaves: Does it roll or slide? Can you stack them?

Recognising the shapes of faces:

- Explore and describe shapes as children handle the blocks, turning them and looking at the various faces. It is important that children examine the blocks from all perspectives, seeing which shapes are 'underneath' the block or on the 'other side'.
- Develop familiarity with the faces of 3D shapes as children run fingers around the impression and the edges of the block face, appreciating the connection between the two.
- Use mathematical language about the shapes of the impressions made by the blocks and comparing the shapes made by different blocks or of different faces of the same block:
- Examples: Straight, curved, round, pointy, bigger, smaller, longer, shorter, corner, like a, same as..
- The children may begin by talking about attributes of the shapes they make by using informal descriptions such as roundy, bendy, straight, pointy and move on to more formal language about curves, sides and corners.
- Look at each resulting impression together, comparing it to the face of the block which made it.
- Reinforce the learning by 'fitting' the block back onto its footprint, making a connection between the face and the block face and the shape of the impression.
- Encourage children to turn each block in their hands looking for faces that might make different 'footprint' shapes.

Additional Resources:

Encourage children to explore making "footprints" using everyday objects;

Hands and feet, spoons of different sizes, dice, lolly sticks, leaves, shells, small world play equipment, pieces of other construction kits.

More ways into the same mathematics

- Printing with cut vegetables and paint
- Solving old fashioned picture cube puzzles
- Shadow play
- Pressing natural materials such as pebbles, twigs, cones and flowers into soft earth
- Making handprints in salt dough that can be baked to keep
- Dip feet in baby talc to make prints on black paper
- Balloon printing – dip a partially blown balloon into paint to print
- Play with shape sorter toys in which blocks are fitted into shaped slots
- Using cutters to make gingerbread or pastry shapes

Story, rhyme and song links

- The Blue Balloon by Mick Inkpen
- Changes by Anthony Browne
- The six blind men and the Elephant by Clare Boucher and Rachel Merriman
- Jack and Jill (good for slopes and rolling)