



Explore shapes and patterns with these sensory, high-contrast Patterning Pentagons, robust enough to be used in a sand pit, water tray or mud kitchen, or with play dough. Support children's developing spatial reasoning as they explore the properties of pentagons, sorting, stacking, symmetry and tessellation.

Shaping the conversation

Offer the pentagons in a variety of settings for children to explore freely – sensory options could include sand, kinetic sand, water, crushed ice, mud, playdough, fabric, rice or lentils. As children play, take the opportunity to develop mathematical language and concepts:

- As children show interest in the shapes themselves, encourage them to count the sides and the corners. Introduce the word 'pentagon'. Are the black and white shapes all pentagons? How do you know?
- Are the sides on a single pentagon the same length or different lengths? How could we check this? (One method could be to rotate a pentagon stone to measure whether all its sides match the length of one side on another stone.)
- Are the white pentagons the same size and shape as the black ones?
- Talk about the position of different pentagons – for example, is a black pentagon next to, in front of, on top of or between two white pentagons?
- Talk about the orientation of the shapes – is the white pentagon the same way round as the black one? Children might also choose to position pentagons upright in damp sand or dough.
- A simple barrier game offers plenty of opportunities for positional language. With a barrier between them, one player lays out a small selection of pentagons in front of them, then describes their position for the other to copy. Do the designs match?



Setting a pattern

The high-contrast black and white pentagons are ideal for creating patterns and pictures:

- Children might choose to make simple abstract patterns with the pentagons. They may enjoy stacking the stones and seeing the contrasting stripes this creates. Or they might create rings with them – either lying flat or standing upright.
- They might choose to design their own pictures, such as a caterpillar in alternating black and white, a flower with a white centre and black petals, or even a dog or other animal.





- Can the pentagons fit together on a flat surface without any gaps? Allow children to discover for themselves that regular pentagons do not tessellate.
- Offering the pentagons on a surface with a single colour (such as plain fabric) makes it easier for children to use the negative space (the gaps between shapes) as part of their pattern. What interesting shapes can the children make between pentagons (such as a diamond, a six-point star or an abstract shape)? To vary this, children could stack two pentagons to make a ten-point star, then use these to make even more shapes in the negative space.
- Using the stones to make imprints in play dough allows children to create patterns where the shapes overlap.

- The pentagons are also ideal for creating repeating patterns, which is an important part of early mathematical understanding. Begin a simple AB or ABB pattern using the pentagons and encourage children to continue it. The next step is to ask children to copy a repeating pattern, then for them to build their own. For example, you might ask them to make a black-white pattern (repeating the black-white sequence at least three times).

Reflection perfection

With their simple shape and bold colours, the pentagons are great for exploring symmetry:

- Offer the stones alongside a selection of small mirrors so children can investigate reflective symmetry independently.



- Encourage children to create simple symmetrical patterns with the pentagons. As well as talking about the position of the stones, you might like to talk about the colour and which way round they are.
- Roll out some play dough, mark a line down the centre (vertically or horizontally), then position a selection of the pentagons on one side of the line. Can the children copy the design on the other half using reflectional symmetry? You might like to offer a mirror to check that the pattern is a reflection.

Give me five!

Extend the learning by looking at pentagons and the number 5 in a variety of contexts:

- In sand, water or another sensory setting, offer a collection of different pentagons, including the pentagon stones and other pentagon blocks or shapes. You might like to talk about how the objects are the same shape but in different sizes.

- Look for fives in the world around us – five features in nature more than you might expect. You might find five fingers, toes, points on a starfish, petals on a flower (such as a buttercup, pansy or primrose), seed pockets in an apple or pear (cut horizontally to see the five-point star these form) or points on a leaf (such as a sycamore, maple, Virginia creeper or ivy). You could also look for pentagons on buildings, vehicles or a classic football.
- Several familiar songs feature the number 5.

Get talking – useful words

Pentagon, side, corner, length, how long, how many, bigger, smaller, same size, next to, in front of, under, on top of, between, which way round, standing up, fit together, gaps, tessellate, reflection.

Books about repeating patterns

Pattern Fish by Trudy Harris

Simon Sock by Sue Hendra

Pitter Pattern by Joyce Hesselberth

Songs featuring the number 5

Five Little Speckled Frogs

Five Little Ducks

1, 2, 3, 4, 5, Once I Caught a Fish Alive

Five Little Monkeys Jumping on the Bed