

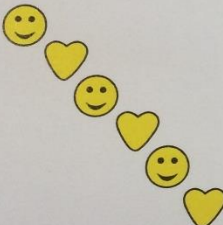
What is a pattern?

“Patterns are basically relationships with some kind of regularity between the elements.”

NRich: Developing Pattern Awareness with Young Children (Sue Gifford, 2017)

Patterns have a predictable sequence and this could be in any element.

The Erikson institute published the ‘Big Ideas of Pattern’ which set out three key concepts that form the basis of understanding pattern in early mathematics.

Big Ideas of Pattern		
Topic	Big Ideas	Examples
Pattern and Regularity 	• Patterns are sequences (repeating or growing) governed by a rule; they exist both in the world and in mathematics. • Identifying the rule of a pattern brings predictability and allows us to make generalizations. • The same pattern can be found in many different forms.	• Dots on a ladybug; posts of a fence; adding 1 to any number gives you the next number. • <i>After lunch comes recess; If we keep counting people's feet, it will always be 2 more.</i> • Big block, little block; big block little block; big block, little block . . . OR snap, clap; snap, clap; snap, clap . . .

© Erikson Institute's Early Math Collaborative. Reprinted from *Big Ideas of Early Mathematics* (2014), Pearson Education.

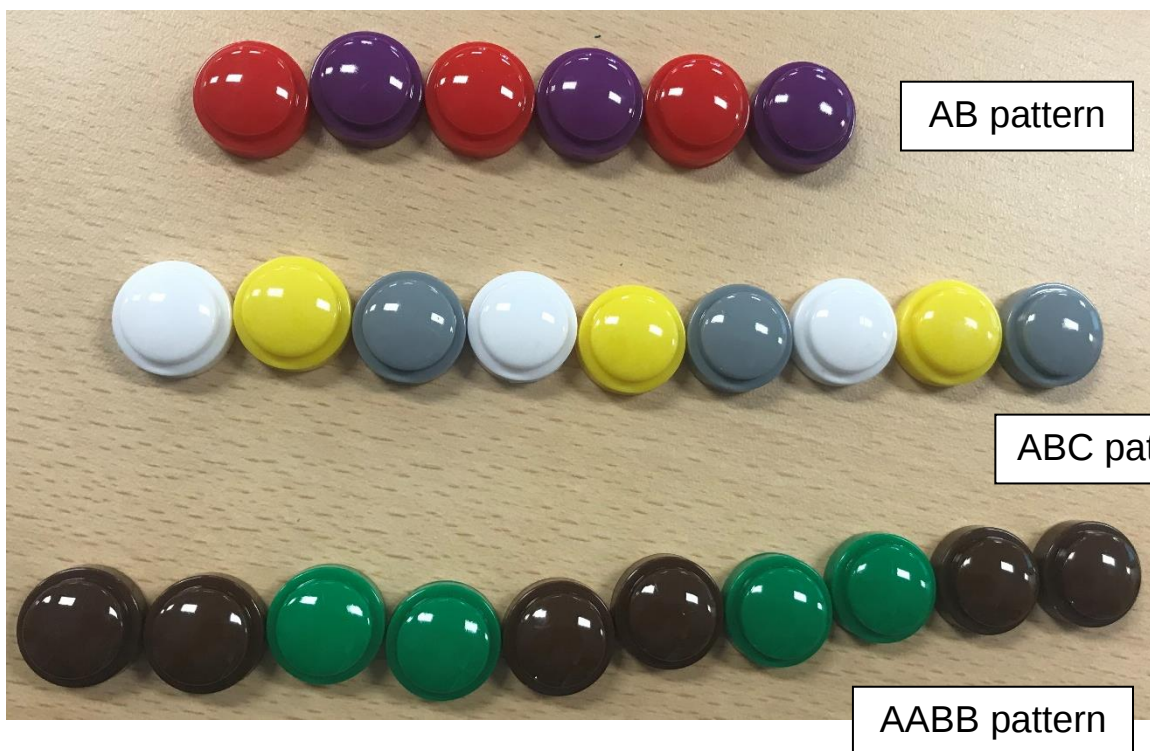
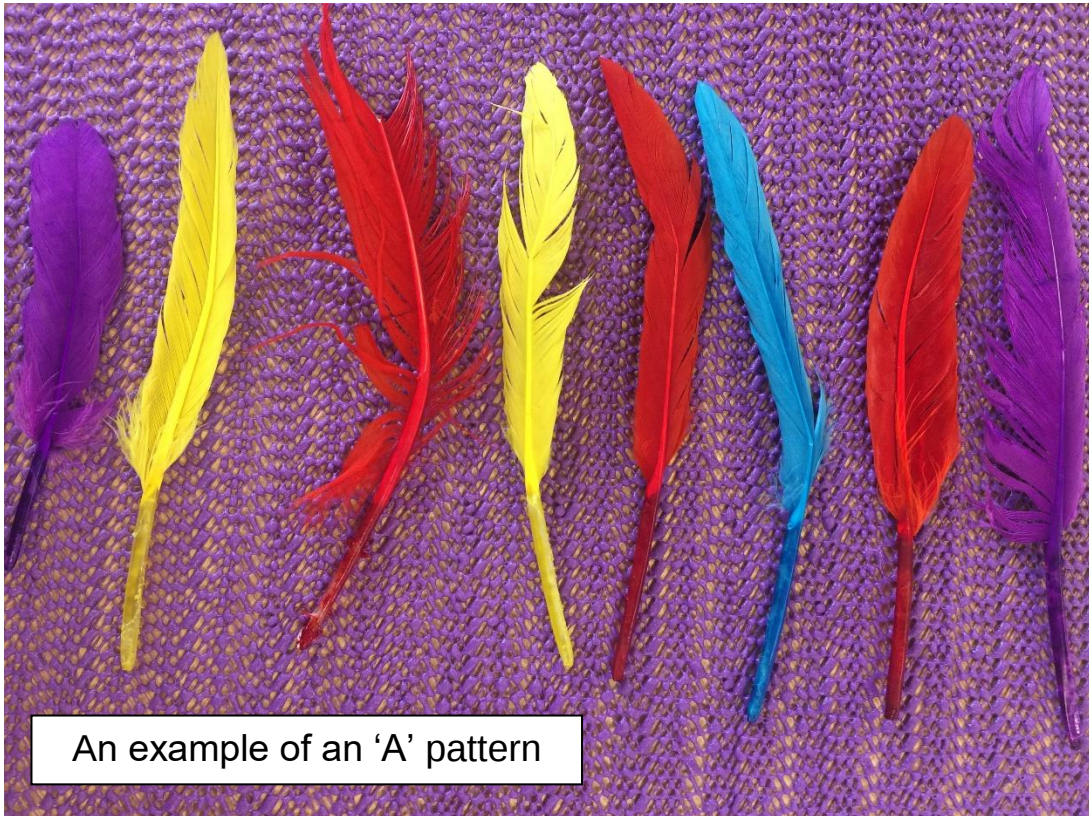
Types of pattern

There are three main types of patterns that children under five years explore: repeating, spatial and growing.

Repeating patterns

Repeated patterns can take many forms. A repeated pattern has a discernible ‘unit of repeat’. This is the smallest part that the pattern can be reduced down to and it still be the same pattern (for example, ‘shell,

pebble' is the repeating element of a pattern of objects ('shell, pebble, shell, pebble, shell, pebble'). The 'unit of repeat' can be as simple as one item being repeated, such as 'hop, hop, hop' (where the unit of repeat is simply 'hop') or 'dinosaur, dinosaur, dinosaur' (where the unit of repeat is 'dinosaur'). These are described as an 'A' pattern. Repeating patterns can be much more difficult than this, moving from A (such as clap) to AB patterns (such as 'clap, wave') up to very complex AABBC patterns (clap, clap, nod, nod, wave).



Repeating patterns can be linear, cyclic or hopscotch.

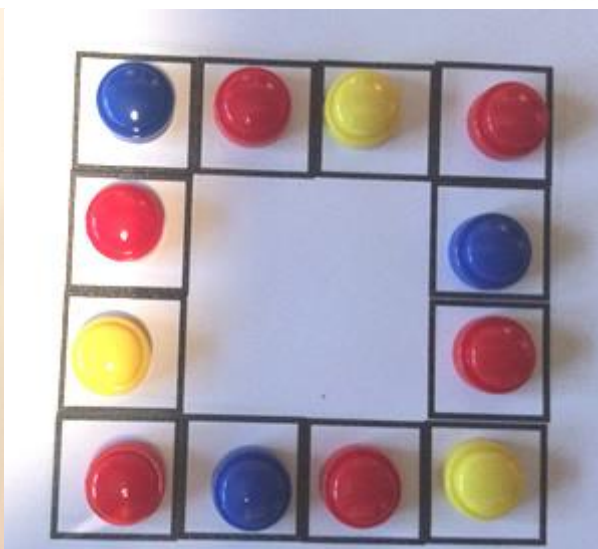
Linear

Linear patterns exist in a line, which can be horizontal, vertical, diagonal, wavy.



Cyclic

Cyclic (or cyclical) patterns are linear repeating patterns that can create a border or frame. They can be any closed shape but children often find a circle easiest to complete as the circle size can be changed readily so the pattern can be accommodated. A cyclic pattern should join up and the pattern should continue around the cycle without end. Cyclic patterns can vary in complexity with different numbers of items in the unit of repeat. It is more challenging to fit items into a cyclic frame than to create a linear pattern. It is more challenging again to fit items into a cyclic frame with a fixed number of spaces as these do not always work, depending on the number of items in the unit of repeat and the number of spaces.



Hopscotch

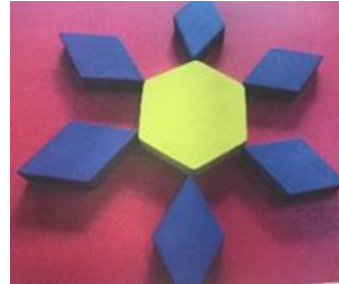
Hopscotch patterns repeat but the items in the unit of repeat might be spatial (orientation or arrangement) rather than another attribute. So, the repeating pattern might be a traditional hopscotch pattern (arrangement) or like the photographs below (same item rotated).



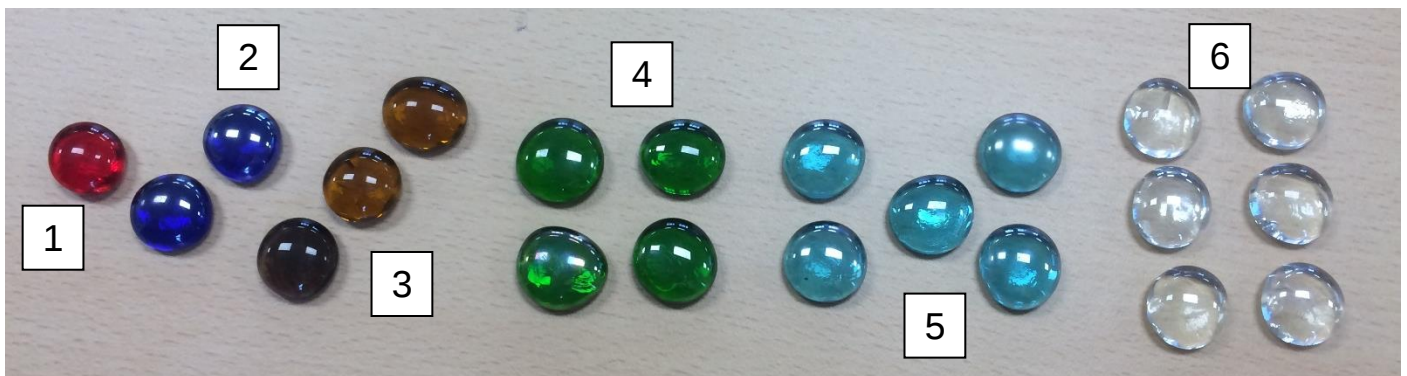
Repeating patterns can exist in objects, actions, rhythms, decorations, sounds and abstract ideas. They are present in the stories we read, in the repeating phrases, the songs and rhymes we sing. They can be represented in drawings and symbols,

Spatial patterns

Spatial patterns involve an arrangement within an area that have some element of form or order. They include symmetrical patterns (rotational or lines of symmetry).



Children can learn to subitise by noticing the spatial pattern in the arrangement of items such as dots on a dice or counters..

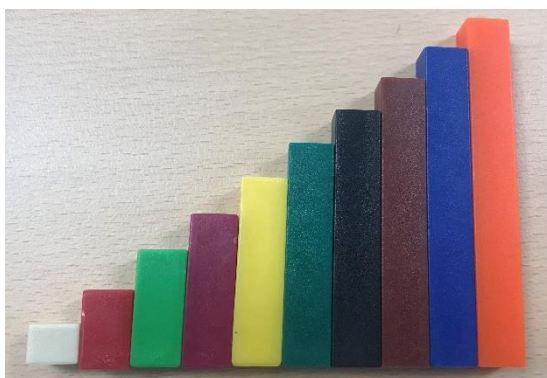


Growing patterns can be spatial patterns when that the growth of the pattern happens within the spatial arrangements of the items.



Growing patterns

Growing patterns grow or shrink in a regular way – they increase or decrease systematically. When we count there is regularity in that the numbers; they grow and get larger by one each time. Conversely when we count backwards the numbers decrease by one each time. Representing this spatially, as a staircase, is a powerful representation for children to engage with.



When we learn to count in 2s, 5s or 10s that regularity is there again in the pattern of how the numbers grow.



Young children can explore growing patterns using objects and images. They can construct staircase growing patterns, triangular growing patterns or square tile growing patterns.

Growing patterns also appear in many favourite story books, such as 'A Squash and a Squeeze' by Julia Donaldson, 'Father Christmas Needs a Wee' by Nicholas Allen. They appear in songs and rhymes too, such as 'Ten in the Bed', 'Peter hammers with one hammer', and 'Five Little Ducks'.