

Practitioner Prompts: Subject Knowledge for Pattern

Why is teaching pattern important?

Pattern is more a feature of all maths rather than a maths topic. Pattern helps us to generalise and make connections between mathematical situations. We look for patterns to help us make sense in maths.

In seeing a pattern, we notice regularity and find mathematical relationships. Pattern is the beginnings of algebraic thinking.

Children who have good patterning skills in early years are good at maths at 7 and 11.

What is a pattern?

A pattern is any predictable sequence (with a rule). The same pattern can be found in lots of different contexts. For example, these are all the same 'AB' pattern:

Red, yellow, red, yellow, red, yellow, ... Blue, green, blue, green, blue, green, ... Stone, shell, stone, shell, stone, shell, ...
Clap, hop, clap, hop, clap, hop, ... Day, night, day, night, day, night, ... Up, down, up, down, up, down, ...

In seeing a pattern we give attention to specific characteristics and ignore others. For example in a sequence of shapes, we might see a pattern in the type of shape and ignore the size and colour. Patterns are all around us and can be in sounds, objects, ideas, text, events, actions, symbols, pictures, numbers, colours and shapes. Patterns can be found in the size, orientation, texture and placement of items as well as the type of item. A pattern can be within a single item (e.g. a stripey shell with a repeating pattern or a star with rotational symmetry) or within a set of items. A pattern has to have some regularity or rule to how it is formed. Children can misunderstand this and say they have found or created a pattern when they have an abstract image or collage. It is important to observe and talk to children to find out if they see a rule or predictable sequence (a pattern). For example, a child putting paint splodges repeatedly on the left then the right side of the paper is creating a pattern but we may be looking at the colours or shapes and not see the child's pattern.

As they become expert patterners, children can: continue, copy, create and fix patterns.

Repeating patterns

A repeating pattern has a 'unit of repeat' and includes single item patterns (e.g. red, red, red, red, ...). In an AB pattern there are two items in a unit of repeat (e.g. star, heart, star, heart, star, heart, ...). It is better for the child to see this as two items repeating rather than alternating or taking in turns. This is to help them understand other patterns, such as ABB or ABC.

Repeating patterns can be **linear** (developing in a direction), which could continue forever. Repeating patterns can also be **cyclic** (e.g. a circle or frame) where the pattern repeats around until it joins up.

Spatial structure patterns

Spacing and arrangement creates patterns where the spacing and arrangement of elements follows a structure or rule. These patterns can be within one item (e.g. a flower) or a number of items (e.g. wallpaper pattern). Arrays and dot patterns are helpful in number. Items and arrangements of items can be symmetrical patterns. Lines of symmetry are rules of reflection. Rotational symmetry are rules of rotation/turning (e.g. an equilateral triangle can be turned 3 times and look the same).

Growing patterns

Sequence of elements that increase or decrease systematically (governed by some rule) and can be spatial or repeating.

The number system is a growing pattern so a staircase of cubes or rods that increases by 1 each time is a simple and important growing pattern.

How to support a child who is making a pattern...

- Make your own pattern (you might create the same pattern but using different items)
- Ask them to help you to make your own pattern like theirs (so they can show you or tell you their structure) or find you another pattern in the environment that is like theirs
- Ask the child to tell you about their pattern
- Ask 'what if' questions (e.g. what if I put the dinosaur there? What if we had two dinosaurs instead of one each time?)
- Ask them to tell/make/show you the unit of repeat (in a repeating pattern)

How to support a child to notice a pattern...

- Model talking about pattern (e.g. the pattern that I am seeing is..." or "I am looking at the colour and I notice a pattern that is ...")
- Model representing the same pattern in different ways (e.g. "I can clap/dance/sing the pattern")
- Model recording patterns by making informal jottings or drawings of them. You might only record the unit of repeat in a repeating pattern and explain why.
- Encourage pattern noticing in the environment (e.g. in clothing fabric, book covers)
- Ask what is the same and what is different between two patterns (they might be the same pattern just in different materials or different patterns)
- Show children a range of patterns in different contexts, e.g. natural materials, body actions, colours) including a pattern in one item (e.g. stripes on a zebra) or using items (e.g. zebra, horse, zebra, horse...)

