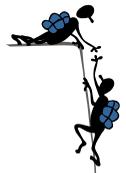


Kindergarten Numeracy Development: Identifying, Copying, Extending, and Creating Patterns

Developmental aspects	Emerging With direct support...	Developing With guided support...	Applying With minimal support...	Extending
The Child	With direct support, and teacher modeling, may participate and may attempt to make sense of mathematical experiences.	With guided support, demonstrates a willingness to explore mathematical ideas while participating in problem solving experiences. Is beginning to show an awareness of numbers, space and time used in everyday life.	With minimal support, demonstrates interest in and a willingness to explore mathematical ideas while purposefully participating in problem solving experiences. Communicates an awareness of how numbers, space, and time are used in everyday life.	Shows interest and curiosity while purposefully exploring mathematical problem solving experiences. Perseveres. Makes and explains connections to numbers, space and time as used in everyday life.
Understanding Pattern				
Identifying, copying, extending, and creating patterns	With direct support, may identify and copy patterns with concrete materials, music, action, and/or language patterns.	With guided support, identifies, copies and extends a given simple repeating pattern, and may create patterns intentionally.	With minimal support, identifies, copies, extends and creates a simple repeating pattern. Beginning to recognize a pattern core or stem.	Identifies, copies, extends and creates patterns of increasing complexity. Describes connections between patterns and recreates patterns in different ways.
The Support/Scaffolding*	The Model: showing, instructing, explaining, directing, making explicit, demonstrating, giving examples	The Coach: structuring, sequencing, focusing, cueing, guiding, organizing, supporting	The Advisor: suggesting, reminding, prompting, monitoring, asking for elaboration	The Mentor: extending, stretching, wondering aloud, exploring, "what if-ing"
*a variety of supports (teachers, peers, environmental, etc.) can be provided at any stage of development				

Scenario: Students are using Unifix cubes and pattern blocks during small group work at math time. The teacher works with a group, then circulates to see what others are doing. Students are aware that at Math Circle, several people will have a chance to share and discuss their patterns with the entire class.



Direct Support

The teacher is working with a small group of students who need direct support to understand the concept of pattern. She makes an AB pattern (red, blue, red, blue, red, blue...) with Unifix cubes and models 'reading' the pattern, *making the pattern explicit* by pointing to each block as she says its colour. Following the teacher's *example*, the students then read the colours of the pattern with the teacher. Next, the teacher breaks off the part of the pattern that repeats (one AB chunk), and slides it along beside the Unifix train, *showing* how it repeats again and again. Then she *directs* the children to make a pattern just like hers.



Guided Support

Thomas begins to make his AB pattern. The teacher sees that he is beginning to understand the concept, and offers guided support by inviting him to chant the pattern with her. She then encourages Thomas to continue the pattern on his own.



Minimal Support

Ibraheim is working with the pattern blocks on his own. He has begun to make an ABBC pattern using the square, triangle, triangle, and hexagon shapes. The teacher offers minimal support by *suggesting* that he show and talk about his pattern to the rest of the class. She gives him some string to circle the repeating part so he can explain it to his classmates. When it is time for math circle, the teacher calls the other students over to see Ibraheim's pattern and invites him to *elaborate on* how he created it.



Without Support

Jackie makes several kinds of repeating patterns spontaneously. Without support, she shares her patterns with some of her classmates. Roberto *stretches* Jackie's thinking by saying, "Let's make up some actions to go with the patterns! Teacher, we want to show the class our action patterns!" The next day, Jackie and Roberto decide to go to the art centre and make pattern frames around their drawings, using some of their ideas from the day before.



Children who are encouraged to look for patterns and to express them mathematically begin to understand how mathematics applies to the world in which they live. Identifying and working with a wide variety of patterns help children to develop the ability to classify and organize information.