

Kindergarten Numeracy Development: Representing by Building, Drawing, or Acting Out

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 Number				
Representing by building, drawing, or acting out	With direct support, may use materials, pictures, drawings or acting out to represent mathematical ideas.	With guided support, uses materials, pictures, drawings or acting out to represent mathematical ideas.	With minimal support, uses appropriate materials, pictures, drawings or acting out to represent mathematical ideas.	Uses materials, pictures, drawings or acting out to effectively represent mathematical ideas.
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 in this K class are often given a verbal problem to figure out. This week's focus is on similarities among people, so they have been asked the question, "If one person has two eyes, how many eyes do five people have?" They are expected to use manipulative materials, such as blocks or counters, to show their thinking and then to draw their solution on paper.



Direct Support

The teacher knows that Jules needs direct support to understand the verbal problem and to show his thinking using manipulatives. She breaks down the process into steps and walks Jules through the solution to the problem step by step. First she gives Jules 5 plastic people from the doll house. She *directs* him to count each doll's eyes, one by one. Then she *explains* that they are going to use blocks to show how many eyes each doll has. She *shows* Jules how to take 2 blocks and put them beside each doll as they count the eyes again. She *demonstrates* thinking aloud as they count the eyes. "Each person has two eyes. Two eyes are the same as two blocks. Now I can count all the blocks to see how many eyes they have all together." Then they count all the blocks together.



Guided Support

Tracie has gathered some blocks but appears to be confused about what to do next. The teacher offers guided support by *organizing* and *structuring* the problem solving steps. She uses questions to *focus* and *guide* Tracie's thinking. "How many eyes does one person have? Can you show their eyes using the blocks? Now, can you use blocks to show all the other people's eyes? How could we find out how many eyes there are all together?" Tracie is then able to see that the next step would be to count all the blocks.



Minimal Support

Freddie needs minimal support to represent his ideas. He has chosen to use one yellow block for each of the people. He adds 2 red triangles to each yellow block. On his paper, he has drawn 5 people with all their facial details. The teacher *prompts* him by asking, "How many eyes are there all together?" Freddie counts to ten. Then she *asks him to elaborate* on what his picture shows, and to explain how the blocks helped him figure out his answer.



Without Support

Harjot says, "Ten eyes all together!" as soon as he hears the problem. Without support, he quickly lays out some pattern blocks, using two in each of five colours, to show his thinking. He draws his picture and prints the number 2 over each person, then the number 10. The teacher *extends his thinking* by asking him if he can show how many eyes there are in the whole class of 20 students. He sets to work on this new problem.



Students need to explore problem-solving situations in order to develop personal strategies and become mathematically literate. Teachers must realize that it is acceptable to solve problems in different ways and that solutions may vary. Positive learning experiences build self-confidence and develop attitudes that value learning mathematics.