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**Students learn to use the mathematics register and to reason mathematically**

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This study examined students' use of the mathematics register as they engaged in thoughtful problem solving and expressed their justifications for solutions to a complex problem. The framework is the mathematics register, a specialised disciplinary language. The critical incident analysed focused on Stephanie, working with three other 4<sup>th</sup> graders and an adult facilitator in a small group. They investigated a counting task (a component of the combinatorics mathematics strand) "How many different towers 4 blocks tall can you build when selecting from blocks of 2 colors?" Analyses focused on language use (oral and written), gestures, diagrams, and use of manipulatives. Elements of everyday language, academic language, and specifics of the mathematics register were deployed with non-verbal representations. Analyses revealed evidence of students' use of the register, elicited by the facilitator and students during the authentic problem-solving. Implications include suggestions for instruction and assessment, in which teachers create settings where students are provided with optimal circumstances to learn, to utilise the mathematics register, and to deploy all cognitive-linguistic resources.