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**Connected tasks: the building blocks of reasoning and proof.**

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Summary: Finding patterns, and making and justifying conjectures are considered the building blocks of mathematical reasoning and proof. Curriculum revisions in the United States and Australia place increased emphasis on problem solving and reasoning in the primary school curriculum. A number of curriculum resources for teachers are available but under current reform efforts, primary teachers require additional ideas to extend problem solving and reasoning in their classrooms. The authors have conducted teaching experiments with Grade 5 students that engaged them in generalising and justifying rules using three pattern-block tasks. The majority of students were able to successfully generalise to find an explicit rule, and to justify their rules. Individually, students in Grades 3 and 4 have also successfully completed the pattern-block tasks. They attribute the success of these students' reasoning activities to the three tasks that shared common features, known as connected tasks. Connected tasks share relationships, contexts, properties, and/or operations. These types of tasks are one way to encourage reasoning and proof throughout each grade level. The authors describe the pattern-block tasks as examples of connected tasks that share relationships and contexts. They describe how pattern blocks can be used to engage students in a variety of open-ended challenges. (Contains 5 figures and 3 tables.) (ERIC)

*Classification:* E43 U63

*Keywords:* problem solving; reasoning; foundations of mathematics; teaching methods; thinking skills; geometric concepts; concept formation; manipulative materials

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