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Hyman Bass* (hybass@umich.edu). *Mathematical connections: Curricular and cognitive.*

I have designed a mathematics course, for pre-service teachers and other math majors, that aims to develop math connections, both across topics in the school curriculum, where these connections are often left invisible, and in problem solving, where I try to develop what I call “connected mathematical thinking.” Topics of the course include: place value; modular arithmetic; rudimentary abstract algebra; geometric and algebraic structure of the number line; basic combinatorics; polynomials; and discrete calculus. Some sample connections: In the decimal expansion of a fraction, the wait time and period have natural modular arithmetic meanings; similarly for the “divisibility tests.” Discrete calculus, an analogue of calculus, generalizes the pattern finding activities common in school mathematics, it is closely linked to the Binomial Theorem, and it interprets power sums of consecutive integers as discrete integrals, thereby affording general methods of computation. “Cross domain problems,” i.e. problems whose solution draws on resources from more than one mathematical domain, prompt one kind of connected thinking. “Common structure problem sets” call for solving a collection of problems and then identifying some mathematical structure that underlies each of them. (Received September 13, 2014)