What do future elementary teachers believe about the nature of mathematics, and to what extent are such beliefs amenable to change? Prior research indicates that personal beliefs about mathematics strongly influence teachers’ pedagogical decisions. This talk is a report on a research project that studied prospective elementary teacher beliefs both before and after a course in the history of mathematics. This study employed a four-dimensional framework developed particularly to assess mathematical beliefs. Participants were surveyed both at the start and at the end of the course on topics such as the relevance of mathematics in society, the need for math in everyday life, and the nature of mathematical thought. In addition, a subset of students participated in semi-structured interviews throughout the semester. Results indicate that some prospective elementary teachers initially viewed mathematics as valuable only for its practical uses, and thought of math as a set of rules and procedures. After a course in the history of mathematics, however, several participants reported remarkably different beliefs. This talk concludes with implications for teaching the history of mathematics, and for teacher education. (Received August 16, 2014)