Our first-year students come from very diverse mathematical backgrounds, and determining the proper first course for each student can be difficult. The placement recommendations determined by our current pencil-and-paper placement exam often do a poor job of predicting student success in a course (as determined by final course grades). To better achieve this and other placement objectives, we developed the Mathematical Online Placement Exam (MOPE). Key features include a flexible database of questions to build exams; detailed, topic-specific feedback; and the opportunity to take each exam more than once. We will report on the results of this project, addressing its success at recommending students to a course in which they will succeed; finding specific topics or question types which may predict success in college math; the use of online placement advice; and overall student satisfaction. (Received October 05, 2004)