not all) are not ready to do the rigorous version in the first year they take calculus. A reality one of us (D.J.L.) notes is that current calculus students are much different from those of 25 years ago. The reform calculus methods work to address this new constituency more so than the potential math, physics, and engineering majors, who often place out of first-year collegiate calculus. It is hoped that future reform efforts will also increase the focus on these advanced placement students. The quote "losing math majors left and right" (attributed to D.J.L. in the Random Samples item) referred to the possible consequence of *not* doing so.

Although the three of us have varied types of involvement in the calculus reform movement, we all agree that there are many issues to be considered in the successful education of undergraduate mathematics students. It is therefore important for the mathematics community to work together to better understand the impact of various teaching methods. Studies such as that done at the National Science Foundation (by S.L.G.) are designed to further improve the undergraduate curriculum. The full report on this work, which will be widely distributed upon completion later this year, will include information on student performance and attitudes, faculty reactions, retention, and other areas of impact. We hope that mathematicians and other educators will use it as a resource for further discussions about curricular excellence in undergraduate mathematics education.

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Math and Science Literacy

I am confused by the article "Northern Europe tops in high school" by Gretchen Vogel (News, 27 Feb., p. 1297). I don't understand the table "Mathematics and science literacy." Why is Austria, with a mean score of 519 in the "significantly above" group, while Australia, with a mean score of 525, is in the "average" group? Hungary, with a score of 477, and the Russian Federation, with a score of 476, are both in the "significantly below" group, while the Czech Republic, with a score of 476, is in the "average" group. Also, I don't understand the amusement ride question (if A is correct, why?).

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Response: The Third International Mathematics and Science Study report included Australia and the Czech Republic in the "average" group because their raw scores had relatively large statistical error bars. Their scores are not significantly different from those of countries in the international average group. The correct answer to the example problem is A. The arrow pointing down represents gravity, the arrow pointing up represents the force of friction due to the "rough wall" described in the problem, and the arrow pointing toward the center of the circle represents the centripetal force exerted by the wall that keeps the rider moving in a circle. Readers who guessed wrong are in good company; only 20% of advanced physics students answered correctly.

Gretchen Vogel

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Fishery and Reef Management

Callum M. Roberts (Reports, 21 Nov., p. 1454) uses a model of reef connectivity to identify beneficial management partnerships and to evaluate marine reserves in integrated networks. The model is clear and compelling. But, like others based on similar approaches (*1*), it makes one simplifying assumption—that fish larvae are dispersed passively by currents. However, the available data do not support this assumption. All indications are that larval reef fishes actively influence their dispersal. Unlike many invertebrate larvae, reef-fish larvae are competent swimmers capable of high speeds and long endurance (*2*). Some reef-fish larvae can swim more than 100 kilometers in a single bout at speeds equal to those of ambient currents. Many taxa may be capable of overriding passive "transport envelopes," either to retard or enhance dispersal (*2*). Field observations suggest that larval reef fishes can detect and respond to the presence of reefs at night and over considerable distances in the day (*2*, *3*). They also exhibit a fine degree of control over the process of settlement and recruitment (*4*). We must establish a sound basis for evaluating connectivity between marine reserves. However, genetic connectivity data will not test Roberts's model: a few individuals a year will maintain genetic links, but will not maintain fisheries.

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