Good & Bad News in STEM Education

[ STEM = Science, Technology, Engineering, and Mathematics]
Good News

- There is broad agreement on the “canon” of core skills and ideas.
Good News/Bad News

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BUT

- Students can get focused too much on learning within their own disciplines and within the controlled classroom environment.
Good News / Bad News / Our Solution

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Our approach:

- Reach across disciplines to take on risky, open-ended problems of unknown difficulty.
Good News

- It’s easier for us to implement uniform, objective standards.
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BUT

- The “credential” mentality leads to an emphasis on the classroom feedback cycle, often discouraging students before they get the opportunity to understand and experience what science and math are really about.
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Our approach:

- Emphasize experimentation, so students experience the excitement and frustration of getting something to work.
Good News

- Support is available for basic research.
Good News / Bad News

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BUT

- Opportunities for undergraduates to do independent research often involve specialized frontiers, rather than more central topics that would better build fundamental skills and understanding.
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Our approach:

- Focus on applying core scientific ideas in new ways, rather than advancing a particular professor’s individual research program.
Good News

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Good News/Bad News

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BUT

- Higher education is poorly matched to the job market: Students strong in core science and math are the best prepared to innovate and embrace new technologies, but are often pushed into specialized research.
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Our approach:

- Give students a broad perspective on how their skills apply to today’s technological challenges.
Our Goal

Since we see our approach as complementing, not replacing, the traditional in-depth disciplinary approach, we hope it will become a long term, integrated component of science and math education at Middlebury, and serve as a model for other institutions as well.

This year’s pilot has offered us a unique opportunity to get this program off the ground.