

# **STEM Task Force**

## **K-12 Education Sector**

### **Sector Group Ideas**

December 19, 2006

- Improve teacher training and professional development in STEM areas
  - More STEM content in elementary and middle school teacher training
  - Require new high school science and math teachers to have content-based masters degrees
  - Provide paid, college-level professional development opportunities for current math and science teachers in an adult-friendly format, such as a 6-week summer academy
- Review the impact of teacher compensation on STEM teaching
  - Differential pay/full year pay for STEM teachers
  - Financial incentives for science and math teachers who complete content-based masters degrees
  - Financial incentives for continuous learning in content areas
  - Incentivize the use of inquiry-based instruction
  - Role of student performance in teacher compensation
- Strengthen STEM curriculum in the schools
  - Review the core science content for relevancy and currency
  - Implement approved new rigorous curriculum with four years of science courses in high school, including three lab-based courses
  - Reaffirm the importance of science courses in the eighth grade.
  - Review the relationship of the program of studies, the core content and assessment systems in STEM subjects
  - Teach STEM subjects in-depth, not with shallow breadth – students need depth and confidence in the basics to succeed at higher levels
  - Take the focus off of calculus in high school -- give a thorough grounding in geometry and algebra instead.
  - Rethink textbook use. Publishing companies have too much influence.
  - Tie the math and science curriculum to the real world, including business and industry -- students and teachers need to see what people do with what they learn.
  - Take a more interdisciplinary approach to science – reflects how science is used and includes real-world subjects like environmental studies that are currently excluded

- Base curriculum on problems and questions instead of based on getting the right answer.
  - Review the powers and duties of School Based Decision Making (SBDM) councils in regard to STEM curriculum
  - Review the General Electric curriculum in Louisville as a possible statewide model
- Review the methods used in science and math instruction
  - Encourage Inquiry-based instruction
  - Teachers working together in teams
  - Students of different ages learning together
  - Project-based learning with professionals in higher education and industry
  - Integrated math courses
  - Use technical tools to accelerate learning
- Review the assessment system in STEM subjects
  - Statewide end-of-course assessments in science and math
  - Reconcile end-of-course examinations with integrated/interdisciplinary content -- the current end-of-course examinations discourage making connections across science fields
  - Consider value-added assessment of student learning
  - Review assessment system for disincentives to recommended curriculum and instruction changes
- Work more closely with the business community
  - Get students out of the classroom and into the workplace through internships, applied courses, etc. to see how science and math is used in the workplace
  - Invite science/tech workers into the classroom to teach how science and math is used in the workplace
  - Provide career pathways for students to follow from elementary school to college
  - One model is the advisory boards set up for the technical centers
- Coordinate the many math and science programs across the state
- Expand the idea of accountability for STEM education to include parents, students and higher education – not just about teachers
- Fix KEES STEM disincentives
- Conduct a public relations campaign about the need for STEM education
- Consider a performance-based school model
  - Base student credits on performance rather than classroom time
  - Performance based school year – ends when the content is mastered, not according to a calendar
  - Fund schools based on learning not teaching -- value-added assessment