STEM Transitions

Boosting Math and Science Rigor Through Integrated Technical Projects
Project Goal:

*Boost rigor of math and science content in STEM-related courses at community college level.*

- Develop *integrated projects* built on math, science, and career cluster standards
- Bring *real-world context* to academic classroom
- Reinforce *math/science in technical courses*
- Encourage *pursuit of STEM-related careers*
16 Career Clusters

- Agriculture, Food & Natural Resources
- Architecture & Construction
- Arts, A/V Technology & Communications
- Business, Management & Administration
- Education & Training
- Finance
- Government & Public Administration
- Health Science
- Hospitality & Tourism
- Human Services
- Information Technology
- Law, Public Safety, Corrections & Security
- Marketing, Sales & Service
- Science, Technology, Engineering & Mathematics
- Transportation, Distribution & Logistics
STEM-Related Clusters
(Identified from 16 Career Clusters by U.S. DOE - OVAE)

1. Science, Technology, Engineering and Mathematics
2. Health Science
3. Information Technology
4. Manufacturing
5. Transportation, Distribution, and Logistics
6. Agriculture, Food, and Natural Resources
Project Background

- State of global economy and growing concerns over competitiveness of U.S. in STEM fields
- Recognition by U.S. DOE-OVAE that community colleges can play unique role in resolving challenges associated with STEM education and training
Project Partners

- U.S. Department of Education – Office of Vocational and Adult Education (OVAE)
- League for Innovation’s College and Career Transitions Initiative
- CORD
- Faculty from 33 Community Colleges
- States Career Clusters Initiative
About CORD

- Center for Occupational Research and Development
- Non-profit, based in Waco, TX
- Founded in ‘79 to serve colleges/schools across U.S.
- Major Areas of Focus:
  - Curriculum and faculty development/Technical assistance
  - Contextual teaching and learning/Integrated instruction
  - Math, science, advanced technologies
  - Support for high schools, community colleges, industry
  - National Career Pathways Network
- STEM Transitions project management/curriculum development
Faculty Conferees

- Total of 40 community college faculty members representing 33 institutions and 18 states
- 28 Technical faculty (1 per pathway)
- 12 Math and Science faculty (1 of each per cluster)
- Roles:
  - Conduct standards review/identify project topics
  - Co-develop project synopses
  - Co-develop project drafts
Benefits of Faculty Engagement

- Assist in the alignment of cluster standards with course content
- Identify and prioritize sticking points, essential math and science content
- Highlight current issues in the industry
- Validate end product
Project Deliverables

Begin with the end in mind…
Classroom-Ready Materials

- Self-contained lessons/projects (61)
- Contextually-based teaching resources
- Integration of math and science concepts with technical discipline
- Use in both academic and technical courses
- Created for postsecondary but easily adaptable for secondary use
- Use in entirety or select from a variety of components to enrich existing courses
Major Tasks
October 2007-December 2008

- Identify existing STEM resources
- Review cluster standards; align with courses
- Identify embedded math and science standards or opportunities for infusion
- Prioritize topics for integrated instruction ("sticking points")
- Develop project synopses and drafts
- Conduct field review via website
- Revise project drafts
- Post revised projects to website
Lesson/Project Format

- Web-based lesson/project materials
- Content sections:
  - Project Overview
  - Equipment/Materials
  - Discussion
  - Activities
  - Faculty Resources (Handouts in native file format)
  - Extension Options
  - Assessment
  - STEM Careers
Project Overview

- Purpose
- Course(s) for integration
- Key terms
- Student learning objectives:
  - Cluster standards
  - Math standards
  - Science standards
Equipment/Materials

- List of materials and equipment
- Safety precautions
- Cleanup instructions
Instructional Content

Discussion
- Industry scenario/connections; methods and teaching strategies

Activities
- Activity preparation
- Procedures
- Expected results
- Wrap-up/conclusions
- Challenge or post-activity assignments
- Alternate methods

Faculty Resources
- Background material; prerequisite knowledge and skills
- Student handouts/supplemental materials and links
- Answer keys

Extension Options
- Expanding or modifying projects to meet local interests

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Assessment Strategies

- Rubrics
- Performance indicators
- Observation checklists
- Discussion prompts
- Quizzes/tests
STEM Careers

- Educational requirements of occupations within cluster/pathway highlighted by project
- Job titles and brief descriptions
- Links to career/industry resources for the cluster
Welcome!

Welcome to the home of the STEM Transitions initiative. This one-year project is being led by the Center for Occupational Research and Development (CORD). Funded by the U.S. Department of Education Office of Vocational and Adult Education under cooperative agreement with the League for Innovation in the Community College, the project is building on the work of the College and Career Transitions Initiative begun by the League in 2003. At the heart of the project are the six Science, Technology, Engineering, and Mathematics (STEM) career clusters that have provided the context for instructional materials that demonstrate the convergence of academic and technical content at the community college level.

CORD staff, in conjunction with 38 faculty consultants from community colleges across the country, have developed 62 integrated curriculum projects for use in math, science, and technical courses in the six STEM-related clusters—health sciences; information technology; manufacturing; transportation; science, technology, engineering and mathematics; and agriculture. The classroom-ready projects are intended to aid in student mastery of essential mathematics and science concepts while motivating students to pursue STEM-related careers.

External Review Phase: September – October, 2008

The teaching materials found under the Integrated Projects tab at left are considered to be in “draft” form and will be available for review and evaluation during the months of September and October. Any interested community college faculty member is invited to review and evaluate the project(s) of their choice. Evaluation forms for comments and suggested revisions are provided within each project.

If you like what you see and choose to implement one or more of the integrated projects, please add relevant implementation suggestions when completing the evaluation form for a particular project. Revisions to the projects will be made upon conclusion of the Review Phase and final versions will be re-posted to this website in November and December.

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Green-Focused Projects

- Agriculture and Natural Resources Cluster
  - Land Cover and Water Quality
  - Environmental Monitoring and Assessment: Riparian and Freshwater Lotic Systems

- Information Technology Cluster
  - Heating Up: Collecting and Organizing Global Warming Data

- Manufacturing Cluster
  - Bubbles and Troubles: Sampling Water to Identify Quality Parameters

- Transportation, Distribution and Logistics Cluster
  - Greening the Way: Building an Energy Efficient Warehouse
  - Environmental Impact of Capital Transportation Projects
  - Responding to Hazardous Materials Spills
  - Greening the Supply Chain: The Carbon Footprint for an Apple
Design Your Own Project

• Consider:
  - Math and science standards
  - Major “sticking points” for your students
  - Technical context/industry scenario
  - Activity components

• Who you will partner with to develop

• Courses for integration
Visit Us…

www.stemtransitions.org

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