STEM Transitions

Boosting Math and Science Rigor Through Integrated Technical Projects

CORD

Leading Change in Education

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

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

League.org FOR INNOVATION IN THE COMMUNITY COLLEGE CCTI College and Career Transitions 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

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Faculty Conferees

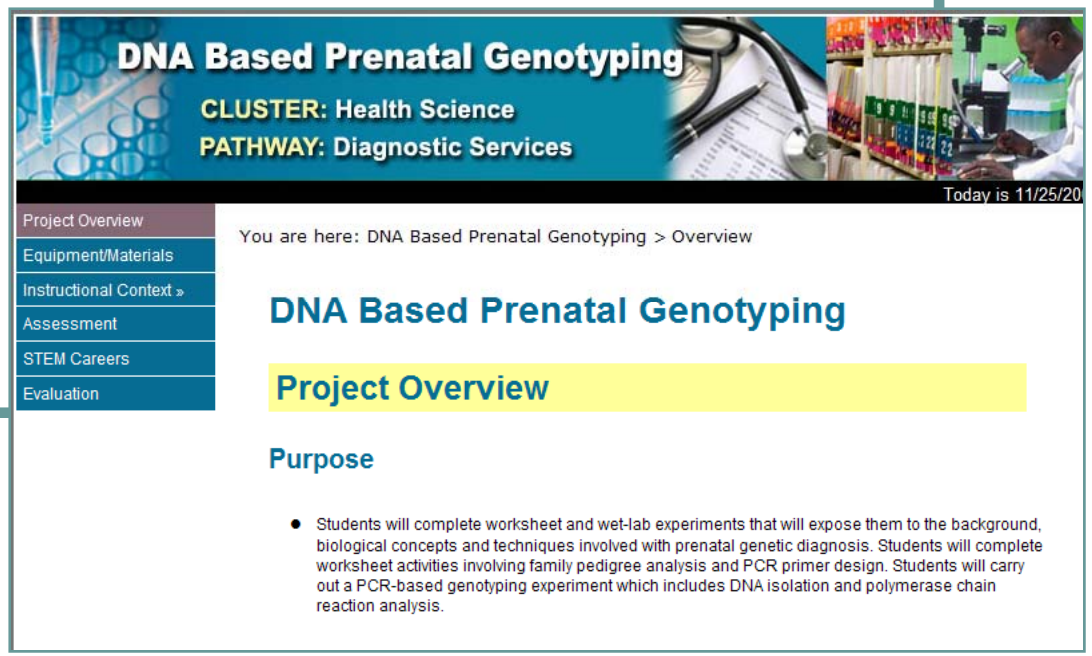
- Total of 40 community college faculty members representing 33 institutions and 18 states
- 28 Technical faculty (1 per pathway)
- 12 Math and Science faculty (1 of each per cluster)
- Roles:
  - Conduct standards review/identify project topics
  - Co-develop project synopses
  - Co-develop project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

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

STEM Transitions Tour

www.stemtransitions.org

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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