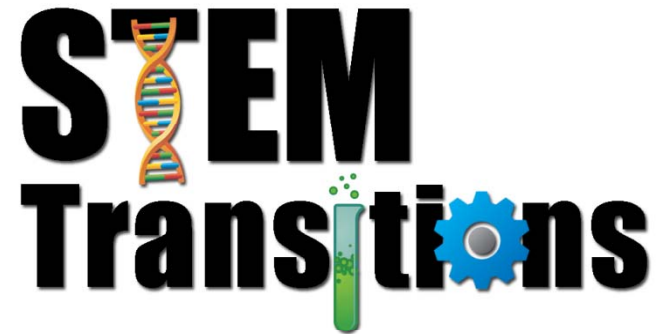


STEM Transitions



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



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

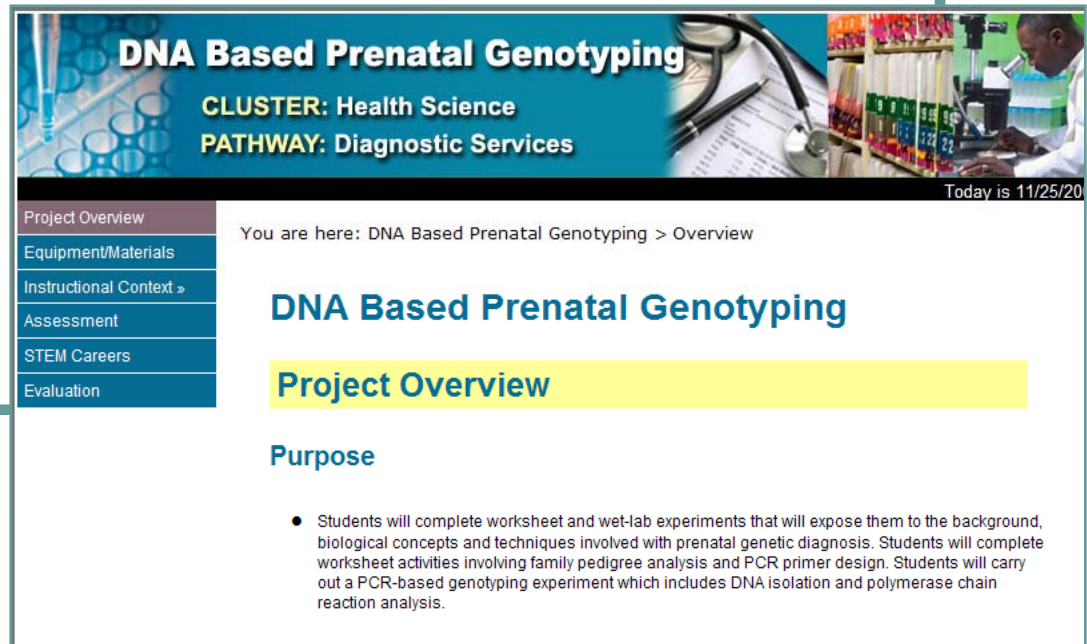
- Total of 40 community college faculty members representing 33 institutions and 18 states
- 28 Technical faculty (1 per pathway)
- 12 Math and Science faculty (1 of each per cluster)
- Roles:
 - Conduct standards review/identify project topics
 - Co-develop project synopses
 - Co-develop project drafts

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...*



The screenshot shows a course page for "DNA Based Prenatal Genotyping". The header includes the course title, cluster "Health Science", and pathway "Diagnostic Services". A navigation menu on the left lists "Project Overview", "Equipment/Materials", "Instructional Context", "Assessment", "STEM Careers", and "Evaluation". The main content area shows the breadcrumb "You are here: DNA Based Prenatal Genotyping > Overview", the course title, and the "Project Overview" section. The "Purpose" section contains a bullet point describing student activities.

DNA Based Prenatal Genotyping
CLUSTER: Health Science
PATHWAY: Diagnostic Services

Today is 11/25/20

Project Overview
Equipment/Materials
Instructional Context »
Assessment
STEM Careers
Evaluation

You are here: DNA Based Prenatal Genotyping > Overview

DNA Based Prenatal Genotyping

Project Overview

Purpose

- Students will complete worksheet and wet-lab experiments that will expose them to the background, biological concepts and techniques involved with prenatal genetic diagnosis. Students will complete worksheet activities involving family pedigree analysis and PCR primer design. Students will carry out a PCR-based genotyping experiment which includes DNA isolation and polymerase chain reaction analysis.

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



The screenshot shows the homepage of the STEM Transitions website. The header features the site logo, navigation links, and two buttons for user registration. The main content area includes a breadcrumb trail, a welcome message, and detailed information about the project's goals and current review phase.

Home :: Project Background :: Contact Us :: Change Password

STEM Transitions
Enhancing Mathematics and Science Rigor Through Evidence-Based Curriculum Projects

New Users Register Here
Registered Users Click Here

:: Using This Site
:: Integrated Projects »
:: Partners
:: Faculty Conferees
:: Other Resources »

You are here: STEM Transitions Welcome Page

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 conferees from community colleges across the country, have developed 63 integrated curriculum projects for use in math, science, and technical courses in the six STEM-related clusters—health science; 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.

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](#)

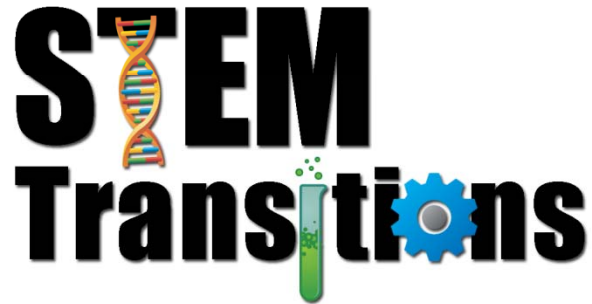


Design Your Own Project

- 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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