Math Science Partnership: QR STEM

Robert Mayes, James Myers, Mark Lyford, Alan Childs, Norm Shinkle, Tim Robinson, Pete Ellsworth, Joel Pontius
Science & Math Teaching Center
University of Wyoming

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QR STEM

QR STEM targets quantitative reasoning across the sciences, providing integrated biology, chemistry, earth systems, physics, and mathematics professional development.

Partners include:

- Over 90 teachers from school districts across Wyoming in Cohorts 1, 2, 3, & 4
- UW and Community College professors from biology, chemistry, earth science, physics, statistics, and mathematics
QR STEM Priorities

- Development of Professional Learning Communities (PLC) across STEM
- Understanding by Design (UbD) as framework to move QR STEM into classroom
- Integrated science content within a context of energy and environment
- Focus on components of QR: quantitative literacy, quantitative interpretation, quantitative modeling
- Place-based pedagogy for engagement
- Lesson Study as part of implementation
- Action Research to explore impact both on teaching practice and student learning
QR STEM Outcomes

- Energy and Environment Unit
  - Integrating science and QR
  - Anchored by performance task

- Implementation of Unit
  - Unit will be implemented in the teacher-participants classroom during the 2010-11 school year

- Assessment of Unit
  - Report on impact of unit on teacher practice and student learning

- Success Curriculum
  - Discussion/plan for integrating the concept of integrated STEM and Energy/Environment
QR STEM Project Symposia

- Introduction to Program
  - May 21-22, 2010 in Powell
  - Overview of program & needs assessment

- Symposium 1: Transportation
  - June 10-12, 2010 in Laramie

- Symposium 2: Electricity
  - July 15-17, 2010 in Riverton

- Symposium 3: Climate Change
  - August 5-7, 2010 in Sheridan

- Peer Performance Task Review
  - October 2010 in Laramie

- Post Performance Task Review
  - April 2011 in Laramie
QR STEM Symposia

Symposium 1: Laramie, Wyoming
- QR focus on quantitative literacy in science
- Energy and Environment STEM content with QL underpinning
- Understanding by Design Stage 1 used to determine enduring understandings and essential questions
- PLC complete Stage 1
QR STEM Symposia

- Symposium 2: Riverton Wyoming
  - QR focus on quantitative interpretation in science
  - Energy and Environment STEM content with QI underpinning
  - Understanding by Design Stage 2: 6 Facets and GRASPS used to begin creating performance task with QR focus
  - PLC complete Stage 2
QR STEM Symposia

- Symposium 3: Sheridan Wyoming
  - QR focus on quantitative modeling/reasoning in science
  - Energy and Environment STEM content with QM underpinning
  - Understanding by Design Stage 3: creation of tasks and instructional strategies
  - Setup Lesson Study for fall semester with focus on performance task implementation, review, and study
  - PLC complete Stage 3
Academic Year Activities

- Lesson Study: Peer review, implement, and reflect on UbD unit

Timeline:

- October Workshop 2010: Peer review each other’s performance tasks and develop pre-assessments
- March 2010: Implement UbD unit, observe a lesson, complete self-reflection, and collect students’ work
- April Workshop 2011: post-review by QR STEM faculty and teachers; share student work from unit
- June 2011: Final submission of UbD unit
What is QR?

Form pairs of science teachers and mathematics teachers.
- What do you believe quantitative reasoning is?
- How does doing mathematics or statistics differ from engaging in quantitative reasoning?
- Provide some examples of quantitative reasoning.
# What is QR?

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What is Understanding by Design?

- Authors: Jay McTighe and Grant Wiggins
- ASCD materials – Association for Supervision and Curriculum Development
- Understanding by Design Handbook served as basis for many of our activities in assessment
Backward Design Process

Three Stages of Backward Design

Stage 1: Identify desired results

Stage 2: Determine acceptable evidence

Stage 3: Plan learning experiences and instruction
Discussion and Questions

- Robert Mayes
  - Science and Math Teaching Center
  - rmayes2@uwyo.edu
  - 307-766-3776