STEM Model Curriculum Units
Curriculum Summit
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Introductions

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Agenda

- Introductions
- Overview of the Model Curriculum Project
- Designing a Mathematics Model Unit
- A District’s Perspective of Curriculum Development
- Walk through a Mathematics Model Unit
- Science Standards Revisions
- Designing a STE Model Unit
- Walk through a Model Science Unit
- Digital Resources
- Questions
Overview of Model Curriculum Project
Model Curriculum Units

- Race to the Top initiative for ESE, which has previously concentrated on standards and assessments, not curriculum materials
- 100 PK-12 units in ELA/literacy, mathematics, science, and social studies by 2014
- 35 units will be tried out during 2012-2013
- Exemplify the shifts in the 2011 *Frameworks*
- *Understanding By Design* model with lesson plans and print/digital media resources
- Extensive unit review process
- WGBH documenting the process
Model Units

The model units will provide districts and teachers with high quality and rigorous units they can choose to teach and/or use to advance their own curriculum development efforts.
Unit Components

★ Unit Plan (UbD Template)
★ Lesson Plans (including lesson sequence)
★ Lesson Resources
★ CEPA – Curriculum Embedded Performance Assessment
★ CEPA Resources
Designing a Mathematics Unit

- Standards/Goals
- Focus on Standards for Mathematical Practices
- Increased student discourse and use of precise mathematical language
- Literacy Standards to support content learning
- Curriculum Embedded Performance Assessment (CEPA)
A District’s Perspective

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Massachusetts Department of ELEMENTARY & SECONDARY EDUCATION
Role of a Curriculum Unit
Team Writer

- Collaborative Effort
- UbD model
- Continuous, reflective, and evaluative process
- Team product
Connections to District Initiatives

★ “Unpacking” the standards
  ★ Progressions
  ★ Vertical Alignment
  ★ Shifts in Instruction

★ Curriculum Mapping
  ★ Unit design

★ Shifts in Instruction
  - TTT
  - Language Rich
  - Higher Cognitive Demand Tasks
  - Math Talks

★ Teacher Evaluation System
Exemplary Elements of Curriculum & Planning

- Demonstrates expertise in subject matter and the pedagogy it requires by engaging all students in learning experiences that enable them to synthesize complex knowledge and skills in the subject.

- Designs integrated units of instruction with measurable, accessible outcomes and challenging tasks requiring higher-order thinking skills that enable students to learn and apply the knowledge and skills defined in state standards/local curricula.

- Develops well-structured and highly engaging lessons with challenging, measurable objectives and appropriate student engagement strategies, pacing, sequence, activities, materials, resources, technologies, and grouping to attend to every student’s needs.
Grade 6 Mathematics

Ratios and Rates

A Walk Through a Model Unit Plan
Elements of the UbD Unit Plan

★ Stage 1: Desired Results
   - Standards
   - Essential Questions
   - Understandings
   - Skills and Knowledge

★ Stage 2: Evidence
   - Curriculum Embedded Performance Assessment (CEPA)
   - Ticket-to-Leave
   - Formative and summative assessments

★ Stage 3: Learning Plan
   - Misconceptions
   - Extended Learning/Practice
   - Assignments
   - Background for Teachers
   - Technology resources
   - Templates
Science and Technology/Engineering (STE)
Revision of the Science and Technology/Engineering (STE) Standards

- Process to date
- Key elements in new standards:
  - Attention to progressions of learning
  - Integration of practices (inquiry & design skills) with content
  - Inclusion of Engineering
  - Career and college readiness perspective
  - Links to Mathematics & Literacy (ELA) standards
Key Resources:

★ National Research Council (NRC) Framework
http://www7.nationalacademies.org/bose/Standards_Framework_Homepage.html

★ Next Generation of Science Standards (NGSS)
http://www7.nationalacademies.org/bose/Standards_Framework_Homepage.html

★ STE Framework Revision Update
http://www.doe.mass.edu/omste/review.html

★ ESE Math/Science mailbox
mathsciencetech@doe.mass.edu
STEM Model Curriculum Units

- Standards and Goals
- Focus on Scientific Practices
- Consideration of Student Thinking
- Literacy Standards
- Curriculum Embedded Performance Assessment (CEPA)
Pilot STE Unit

Energy:
Work (Energy Transfer) and Conservation of Energy
Digital Resources

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Questions?
Questions after today...

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