STEM Model Curriculum Units

Curriculum Summit

November 12-13, 2012

Massachusetts Department of
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EDUCATION

Introductions

- Anne Marie Condike
- ESE Model Curriculum Project Lead

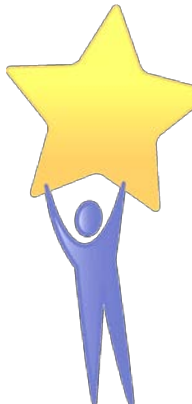
- Joyce Bowen,
- ESE Science Coordinator

- Carolyn Jacobs
- WGBH Senior Manager, Training and Professional Development, Educational Productions

- Patricia Juranovits
- Haverhill Public Schools Mathematics Curriculum Supervisor

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

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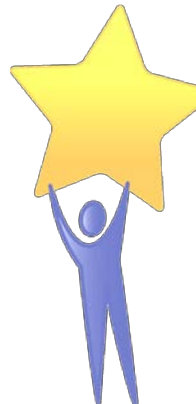
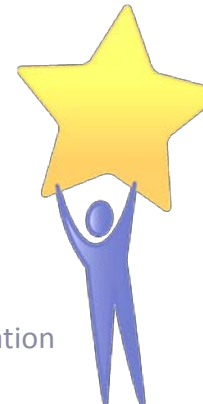
Model Curriculum Units

- 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



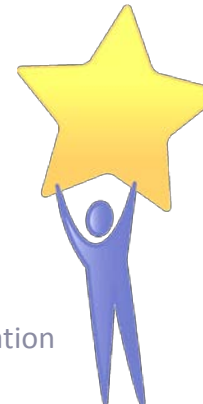
Model Units

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.



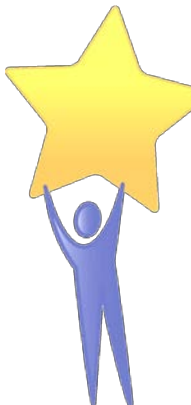
Unit Components

- 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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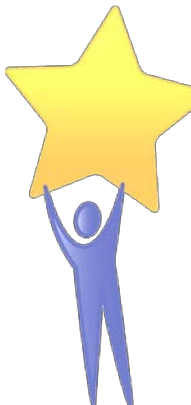
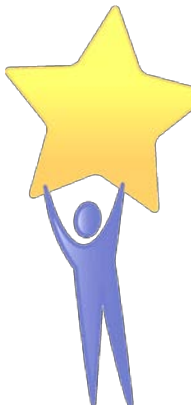
Haverhill's Team

- Rebecca - Elementary
- Tiffany – Middle School
- Judy – High School
- Patty - District



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

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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)

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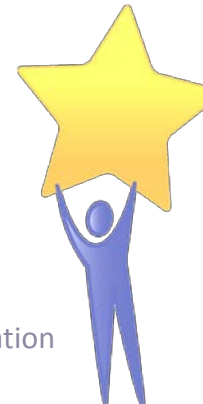
Revision of the Science and Technology/Engineering (STE) Standards

- 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



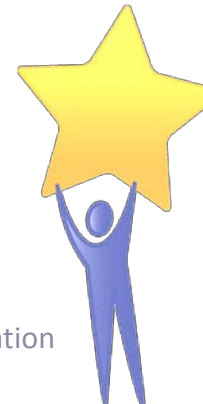
Key Resources:

- 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

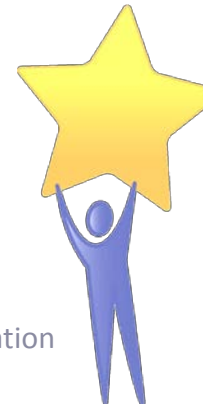
- STE Framework Revision Update
  http://www.doe.mass.edu/omste/review.html

- ESE Math/Science mailbox
  mathsciencetech@doe.mass.edu



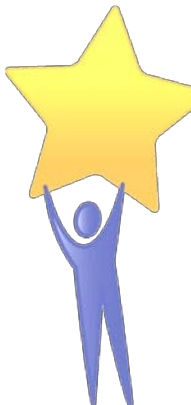
STEM Model Curriculum Units

- 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

PBS LearningMedia™

teachers'domain®

carolyn.jacobs@wgbh.org
617 300 3640

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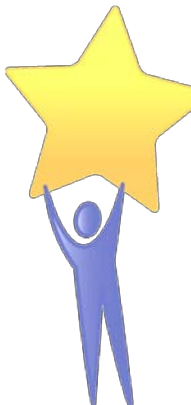
Questions?



Questions after today...

- Please direct to:
  - modelcurr@doe.mass.edu