Preparing STEM-Centric Elementary Teachers

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Session Goals

- Examine the Maryland STEM Standards of Practice (SOP) as a framework for integrated STEM
- Create assessments to evaluate student learning in a STEM lesson
- Explore the components of Maryland’s model for preparing elementary STEM teachers
Maryland’s STEM Task Force selected recommendations:

- Triple the number of teachers in STEM shortage areas, increasing their retention, and enhancing the STEM preparation and aptitudes for elementary and early childhood teachers

- Ensure that all P-20 mathematics and science teachers have the knowledge and skills to complete the college and career-ready curriculum
STEM-Centric Education

STEM education in Maryland supports an approach to teaching and learning that integrates the content and skills of science, technology, engineering, and mathematics.
Professional Development

Student Learning

Assessment

STEM Standards of Practice
The STEM Standards of Practice guide STEM instruction by defining the combination of behaviors, integrated with STEM content, which is expected of a proficient STEM student.
STEM Standards of Practice

- Learn & Apply Rigorous Science, Technology, Engineering, & Mathematics Content
- Integrate Science, Technology, Engineering, & Mathematics Content
- Interpret & Communicate Information from Science, Technology, Engineering & Mathematics
- Engage in Inquiry
- Engage in Logical Reasoning
- Collaborate as a STEM Team
- Apply Technology Strategically
Professional Development

Student Learning

Assessment

STEM Standards of Practice
Attributes of a STEM-centric Learning Environment

- Utilize the engineering design process
Engineering Design Process

- Generate Ideas
- Define Problem
- Test Solution(s)
- Select Solution(s)
- Make Item
- Evaluate Item
- Present Results

EbD™ Standards-Based Model

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Attributes of a STEM-centric Learning Environment

- Utilize the engineering design process
- Engage in the scientific process
- Apply mathematical practices
- Explore appropriate uses for technology
- Support collaboration and communication
- Encourage risk taking
- Align STEM lessons with real life context
Third Grade Unit: Measuring Forces and Gathering Data on their Interactions

- Unbalanced and balanced forces
- Relationship between force and movement—measure distance; graph results
- Decrease force necessary by using simple machines—using spring scales, measure force; graph results
You spend a majority of your day in school. How could you make your school day easier?

**Design Challenge:**
Create a device with a specific purpose to make your school day easier.
Constraints:

- Use any of the available materials
- Use one or more simple machines in the design
Professional Development

- Student Learning
- Assessment
- STEM Standards of Practice
How can we assess student learning in this lesson?
Create an assessment

Work together in teams to:

- Identify one STEM Standard of Practice to be assessed
- Identify the type of assessment
- Identify criteria ("look for s")
Just a few examples…

- Exit Ticket
- Collaboration Rubric
- Measurement Assessment
- Graphing Assessment
- Science Double Entry Journal
- Questioning Assessment
- Communication Rubric
- Presentation Rubric
- Science Assessment
- Real Life Application Assessment
- Engineering Design Process
- Technology (Twitter, Edmodo, Voice Thread)
Professional Development

- Student Learning
- Assessment
- STEM Standards of Practice
STEM teachers can:

- demonstrate strong content knowledge
- plan and deliver integrated STEM instruction with real-world application of skills
- assess impact on student learning
Elementary STEM Preparation

- Create Elementary STEM Network with project partners
- Collaborate with national STEM education and teacher preparation experts
- Develop STEM Standards of Practice for Teachers
- Define components of approved Elementary STEM programs
Pathways for Elementary STEM Teachers in Maryland

- Pre-service teachers—Initial Elementary Certification with concentration/minor/specialization in STEM
- In-service teachers—Endorsement Instructional Leader: STEM (PK-6)
Elementary STEM Preparation in Maryland

15 of 24 School Districts impacted

12 programs being developed

300 + teachers being prepared

800+ teachers benefitting
Professional Development

- Student Learning
- Assessment
- STEM Standards of Practice

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Leigh Catterton
Integrated Arts Teacher
Cecil County Public Schools
Contact us:
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