

Supporting Spatial Measurement Teaching with Technology

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**Strengthening Tomorrow's Education in Measurement
(STEM)**



Session Overview

- Brief Introductions (ourselves & STEM project)
- Small group activities:
 - Exploration of Simulations / Manipulatives
 - Area of Rectangular Regions
- Discussion

Presenters

- **Eryn** – 3rd year graduate student and beginning 3rd year on STEM; Taught mathematics and Math for Preservice Elementary Teachers at Minnesota State, Mankato
- **Funda** – 5th year graduate student and was on STEM in all those years; taught mathematics grades 5-8 in Turkey and taught Math for Preservice Elementary Teachers.
- **Kelli** – Recent graduate of Michigan State's undergraduate Elementary Education Program and beginning 3rd year on STEM

Strengthening Tomorrow's Education in Measurement

Curricular treatment - Length, Area & Volume

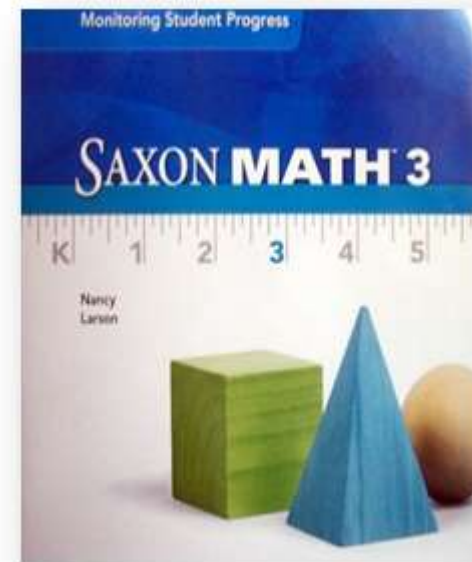
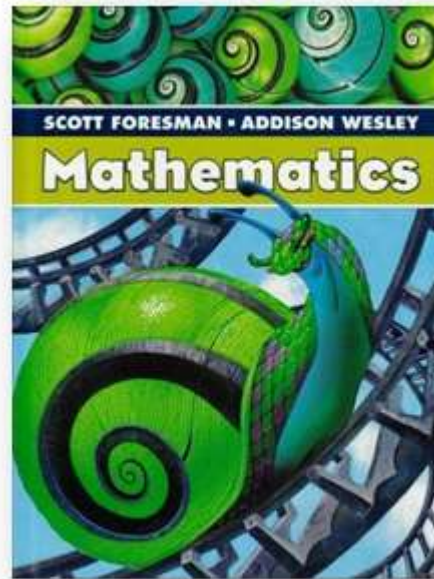
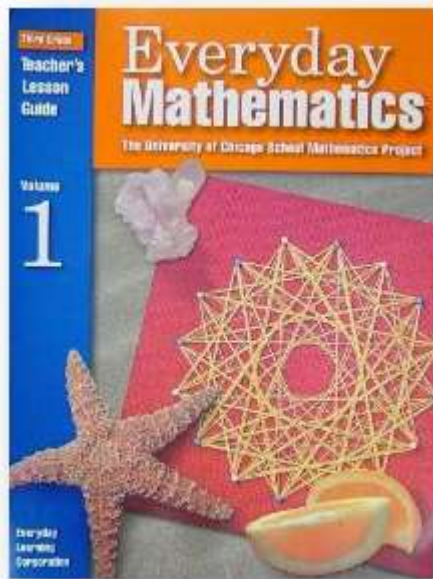
- Do current U.S. elementary mathematics curricula provide sufficient opportunities to learn spatial measurement?

Putting findings to use

- Professional Development with PD facilitators in MI
- Lesson Study with Preservice Elementary Teachers
- Communication with Curriculum Authors

STEM - Three Curricula

Dynamic Representations and Activities



Length, Area, and the Common Core

- Grades K-2 focus on length measurements.
- Concepts of area are introduced to children in the 3rd grade.
 - Square units
 - Counting squares in order to find the area of a plane figure
 - Relating area to multiplication and addition.
- In 4th grade, students learn to apply the area formula for rectangles.
- By 5th grade, length and area concepts should be solidified as the student are expected to use these ideas when studying area of shapes other than rectangles as well as volume of different objects.

Session Goals

- **Session goals:**
 - explore measurement ideas using technology
 - think about classroom use
 - **Other than $A=L \times W$, what do you want your students to learn / know / understand about area?**

STEM website and applets

(msu.edu/~stemproj)

- Explore applets – choose group A, B, C, D, or E
- Think about answers to:
 - What patterns do you see?
 - How could the applets work together or with your curriculum?
 - What ideas or concepts **in area** could these support?

Area of Rectangular Regions: Goals

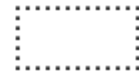
- Recognize meaning and variety of unit of area measurement,
- Structure two-dimensional regions
- Using sufficient and insufficient units efficiently and effectively in covering two-dimensional regions
- Recognize why length times length produces area
- Making connections between linear units and square units in finding area of rectangular regions

Area of Rectangular Regions - Launch

Area Simulation #6:

What is the area of the gray shape?

Start



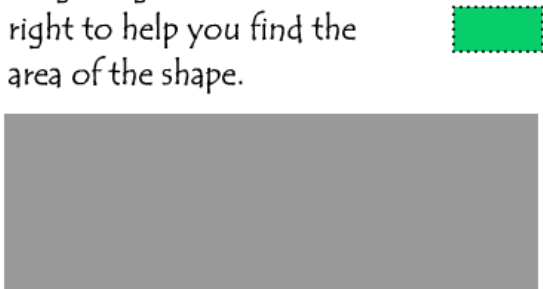
https://www.msu.edu/~stemproj/flash/basic_counting/area_rec_tile.html

Area of Rectangular Regions - Explore

Area Simulation #1

What is the area of the gray shape?

Drag the green tiles on the right to help you find the area of the shape.




Reset

Area Simulation #8

What is the area of the gray shape?

Start



https://www.msu.edu/~stemproj/flash/drag_pieces/area_rec_drag.html

https://www.msu.edu/~stemproj/flash/tickmarks/area_square_tickmarks.html

Area of Rectangular Regions

- What are different ways we can find area of rectangular regions?
- What are different units we can use to find the area?
- Why do we prefer square units over rectangular units?
- What is the relationship between unit and area?

Discussion

- What stood out to you today while working in these activities?
- What helped you think differently about this content area?
- Which portions do you think might be a good transfer to your classroom practice?

Thank you!

Please feel free to contact us with questions, suggestions,
or any comments:

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STEM site: msu.edu/~stemproj