Carol Taylor
Math Teacher
Hanes Magnet School
Winston-Salem/Forsyth County Schools

SE Regional Space Grant Meeting
September 10, 2011
Carol Taylor

- Kenan Fellow
- National Board Certified Teacher
- 2009 Edyth Sliffe Award (Mathematical Association of America): Excellence in Mathematics Teaching
- Master’s of Applied Statistics – Ohio State University
- B.S. (Mathematics) – Miami University (Ohio)
- Research Intern – Battelle
- Biostatistician – Wake Forest Medical Center
- Math Teacher – Winston-Salem/Forsyth County Schools
Topics

- NASA Education Resources
- Aviation Safety: Eco-Core Research
- Kenan Fellows Lesson Plan
NASA Education Resources

- NASA Education Website
- Space Math Booklets
- Algebra Lessons
- Climatograph
Space Math Booklets

- Real-World Math Problems
- Topic by Problem Number Matrix
- Problem-Solving to Calculus
- Space Math I
- Lunar Math
- Image Scale Math
Algebra

- Space Shuttle: Linear Regression
- Orion: Geometry and Algebra
- Weightless Wonder: Quadratic Functions
My NASA Data

• Satellite Data Set
• Location: longitude and latitude
• Create Climatograph
• Modifications: Created data sets
• Social Studies Curriculum: Asia, Africa, Australia
• Science Curriculum: Weather, Climate
Aviation Safety

Eco-Core Water Absorption Properties

• Eco-Core Properties
  • Lightweight
  • Fire resistant
  • Closed Cell
• Eco-Core Modification
  • Expancel 920 DU 80
Objective

Modify Eco-Core to become closed cell while maintaining its low density and fire resistant properties.
Approach

- Eco-Core/Expancel samples were immersed in water and placed in a vacuum chamber.
- Pressure was reduced to bring water to a boiling point.
- Samples were removed when no more submerged bubbles were evident.

<table>
<thead>
<tr>
<th>Sample</th>
<th>Percent Expancel (920 DU 80)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A92</td>
<td>100%</td>
</tr>
<tr>
<td>B92</td>
<td>50%</td>
</tr>
<tr>
<td>B92x</td>
<td>50%</td>
</tr>
<tr>
<td>C92</td>
<td>25%</td>
</tr>
<tr>
<td>D92</td>
<td>0%</td>
</tr>
</tbody>
</table>
## Results

<table>
<thead>
<tr>
<th>Sample (% Expancel)</th>
<th>Weight (g) Before Immersion</th>
<th>Weight (g) After Immersion</th>
<th>Weight (g) Percent Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>A92 (100%)</td>
<td>1.049</td>
<td>1.109</td>
<td>+5.7%</td>
</tr>
<tr>
<td>B92x (50%)</td>
<td>1.045</td>
<td>1.210</td>
<td>+15.8%</td>
</tr>
<tr>
<td>B92 (50%)</td>
<td>0.845</td>
<td>1.019</td>
<td>+20.6%</td>
</tr>
<tr>
<td>C92 (25%)</td>
<td>2.564</td>
<td>3.878</td>
<td>+51.2%</td>
</tr>
<tr>
<td>D92 (0%)</td>
<td>2.085</td>
<td>3.779</td>
<td>+81.2%</td>
</tr>
</tbody>
</table>
Concluding Remarks

Conclusions

• The modified Eco-Core samples are open cell.

Future Research

• The amount of Expancel used.
• Use expanded Expancel.
• Estimate the amount of Expancel needed to become closed cell.
Kenan Fellow Lesson

7th Grade Math Common Core Standards

• Ratios and Proportional Relationships
  • Analyze proportional relationships and use them to solve real-world and mathematical problems.

• Geometry
  • Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.
Kenan Fellow Lesson

- Simulate the *Eco-Core Water Absorption* research using various types of wood.

- Measure dimensions, weight of wood samples.

- Calculate volume, surface area and density.

- Immerse samples in water.

- Measure dimensions, weight of wet wood samples.

- Calculate volume, surface area and density.

- Calculate percent change in measurements.
Kenan Fellow Lesson

Materials

• Wood samples – prisms, cylinders – some painted

• Immersion Containers

• Digital Scale

• Caliper
Outreach

• Weekly Learning Team Meetings
  • 7th Grade Math Teachers
• School Wide Faculty Meeting
• District Wide 7th Grade Math Teachers
• Kenan Fellows Teacher Network and Website
• Science/Math Professional Teachers Conference
• My school website
Reflection

• Thinking
• Collaboration
• Lab Experience
• Rejuvenation
• Continue Outreach
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