Industrial Strength STEM

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Teaching Fellow, PTC & FSU STEM Certificate Program
Concept Development
- Planning
- Research
- Ideation

Detailed Design
- Detailed Modeling
- Optimization

Production
- Production
- Materials
- Manufacturing
- Assembly

Field Support
- Maintenance
- Service
- Sales
- Marketing
- Retirement

Berry, 2014: Boston University

Explore Create Share
ECS vs. EDP

Engineering Design Process (MA)

Explore-Create-Share

Explore
- Ideation
- Modeling
- Optimization

Create
- Project planning
- Research
- Research analysis

Share
- Artist
- Journalist
- Engineer
- Entrepreneur
- etc.

Berry, 2014: Boston University
Explore:
Planning, product stories, research

Create:
Generate ideas, modeling, optimization

Share:
Industry role assignments

Berry, 2014: Boston University
Explore
Planning, product stories, research

Create
Generate ideas, modeling, optimization

Share
Industry role assignments

Berry, 2014: Boston University
MAY THE FORCE BE WITH YOU

Guiding Principle
Can you build a delivery truck and road that will safely and efficiently remove barrels of oil from the top of the mountain?
Creo View App

Product Research
Exploration Challenge #1

• Which surface made your car go further, carpet or tile? Why?
• What invisible force was at work?
• Was the force pushing or pulling?

Concepts Research
Berry, 2014: Boston University

**Explore**
Planning, product stories, research

**Create**
Generate ideas, modeling, optimization

**Share**
Industry role assignments

Project Challenge

Student Solution
Malcolm McLean

OCEAN FREIGHT CONTAINERS
ONE OF THE MOST IMPORTANT INVENTIONS
OF ALL TIME?

Stories of product creation
Design Criteria

Safety

Efficiency
Design Constraints

- Truck Materials
- Road Materials
- Time
Create products

Sketch-based

Kit-based

Craft-based

3D digital-based

Manufacturing-based

Modeling

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**Did your truck carry its load safely down the ramp?**

<table>
<thead>
<tr>
<th>Test #</th>
<th>Results</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>☑ Yes</td>
<td>It was hard to start the front car with the brake light on. The front fell apart.</td>
</tr>
<tr>
<td>2</td>
<td>☐ No</td>
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</table>

**Did your truck go far in the wind?**

<table>
<thead>
<tr>
<th>Test #</th>
<th>Results</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>□ inches</td>
<td></td>
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</table>
Can your truck carry its load safely down the mountain?
PERSEVERANCE

“Do or do not. There is no Try”

Habits of Mind
Berry, 2014: Boston University
<table>
<thead>
<tr>
<th>Industry Roles</th>
<th>Scientist</th>
<th>Anthropologist</th>
<th>Engineer</th>
<th>Artist</th>
<th>Entrepreneur</th>
<th>Journalist</th>
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<tbody>
<tr>
<td>Research Proposal</td>
<td>User Storyboard</td>
<td>Field Study</td>
<td>Design Brief</td>
<td>Craft-based Model</td>
<td>Business Plan</td>
<td>News Article</td>
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<td>Experiment</td>
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<td>Map</td>
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<td>Kit-based model</td>
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<td>Advanced manufacturing model</td>
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<tr>
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<td>Political Cartoon</td>
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<td>Berry, 2014: Boston University</td>
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</table>
Bringing your product to market

This truck won't fall over.

Ha ha! Our truck is very light so it goes far in the wind.

You can put a lot of stuff in the middle.

You can put 4 barrels in.

Store stuff down low so it won't fall out.

Our truck is the best!
Immerse Students in the Story of Product Creation and Challenge Them to Take a Role in New Innovations.