



PROBLEM BASED LEARNING AND STUDENT CENTERED EDUCATION

ENGAGING STUDENTS IN AUTHENTIC STEM
DISCOVERY AND INNOVATION

Kelli-Marie Vallieres, Ph.D.
Director, PBL Resource Center
President/CEO, Sound Manufacturing

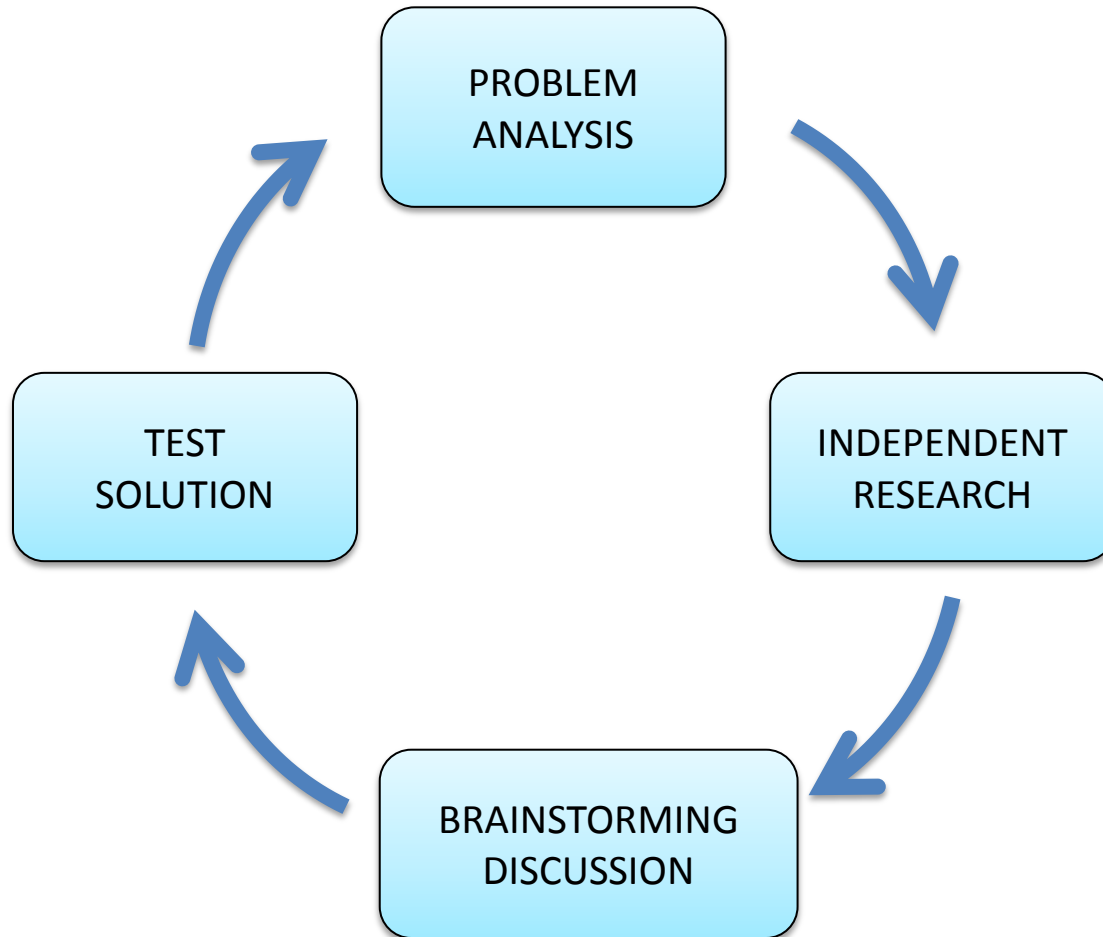
**NSF: NEXT GENERATION STEM
LEARNING FOR ALL**

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What is Problem Based Learning?



PBL teaches students *both content and problem solving skills* through engagement with *authentic real-world problems*.



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What is Problem Based Learning?



Participants collaborate in
Introduction to PBL workshop at
Society of Manufacturing Engineers'
conference

Collaboration

Self-directed
learning

Instructor is a
facilitator

Not
prescriptive

Problem itself
drives the
learning

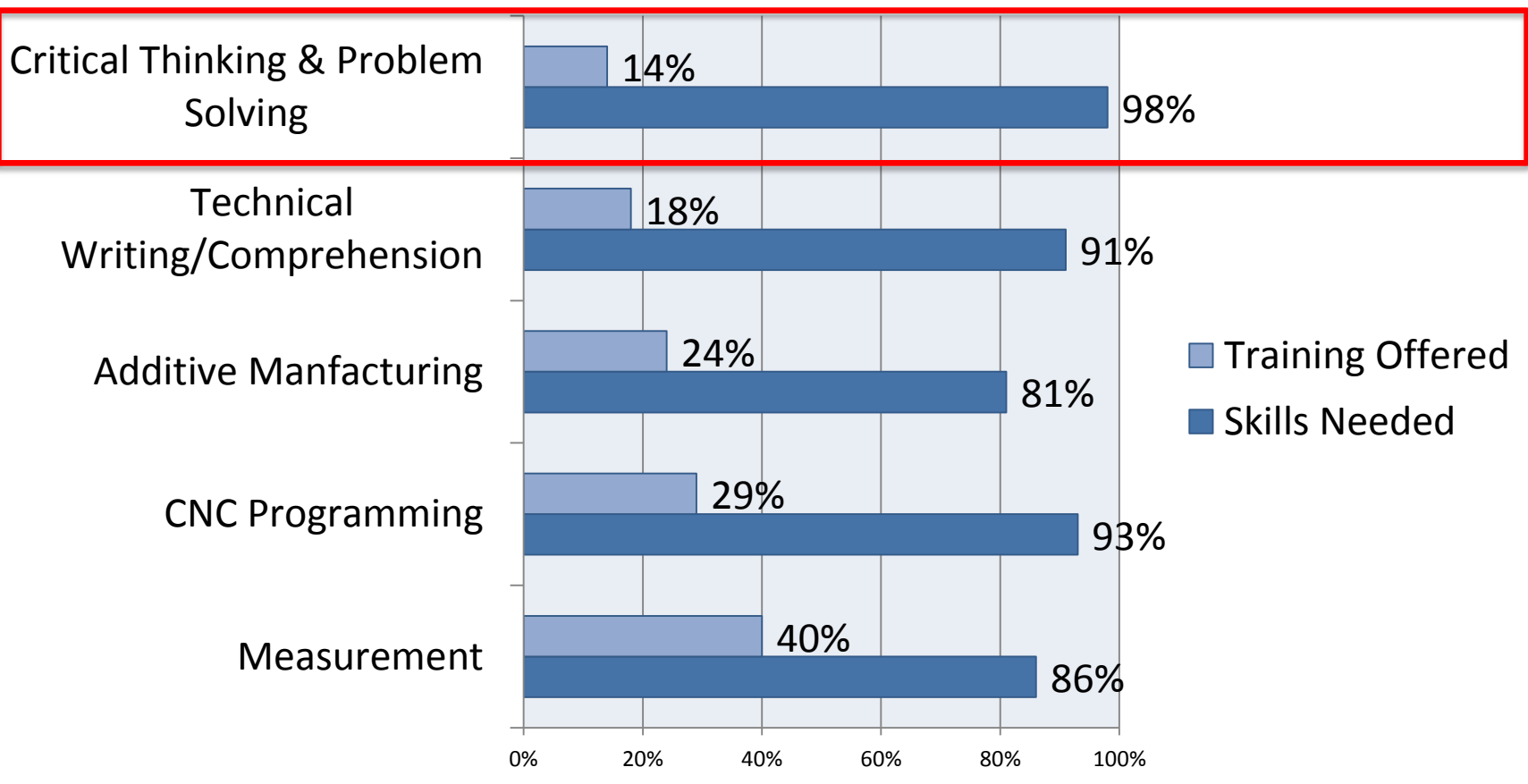


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Why PBL?

Technical Skills Needed Vs. Training Offered

2014 Survey of CT Manufacturing Workforce Needs, CBIA



Foundational Belief of PBL Projects

Collaboration between education and industry, in conjunction with student-centered learning, is essential to ensuring student readiness for a 21st century workforce.

Research on PBL

PBL improves:

Critical thinking & problem solving skills

Retention of content

Deeper learning

Motivation

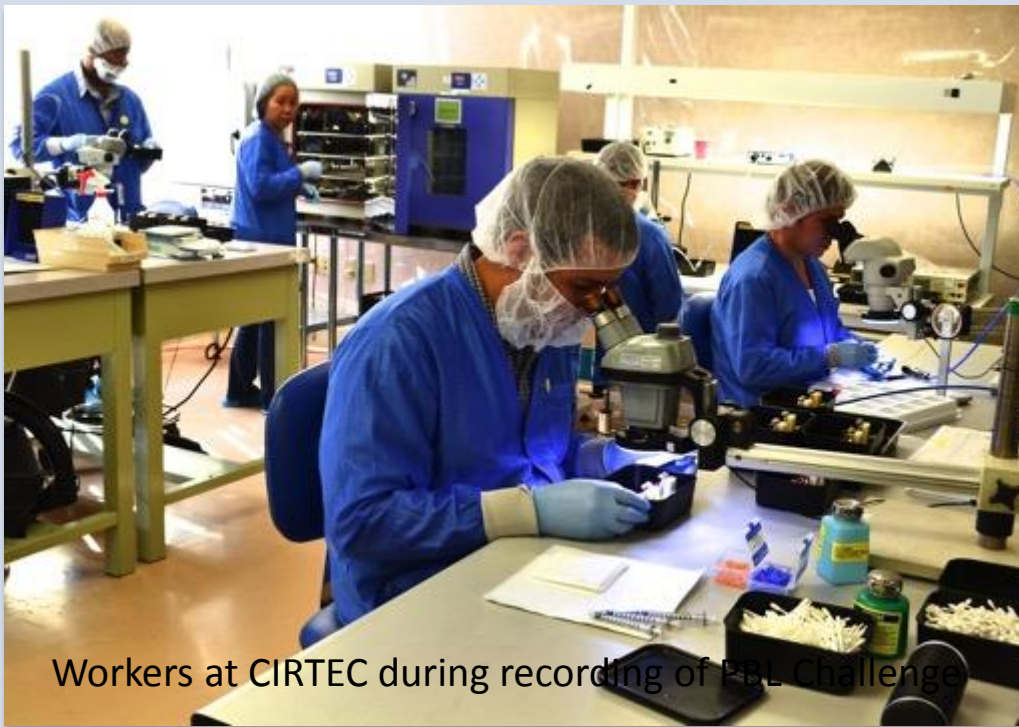
Transfer of problem solving skills

Teamwork



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Industry Collaboration

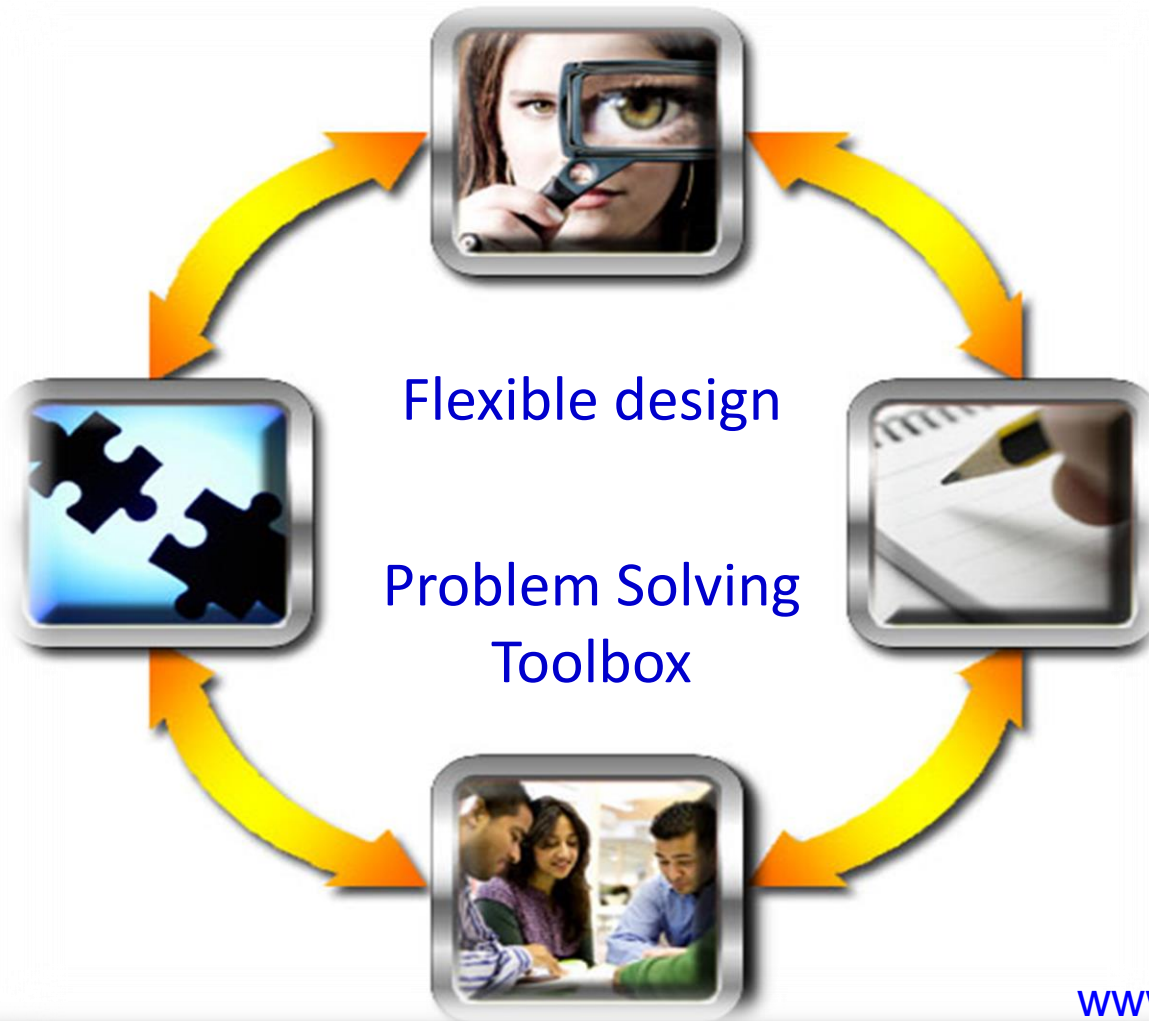


Workers at CIRTEC during recording of PBL Challenge

Industry collaboration is essential to ensuring that what is taught in the classroom is current and relevant.

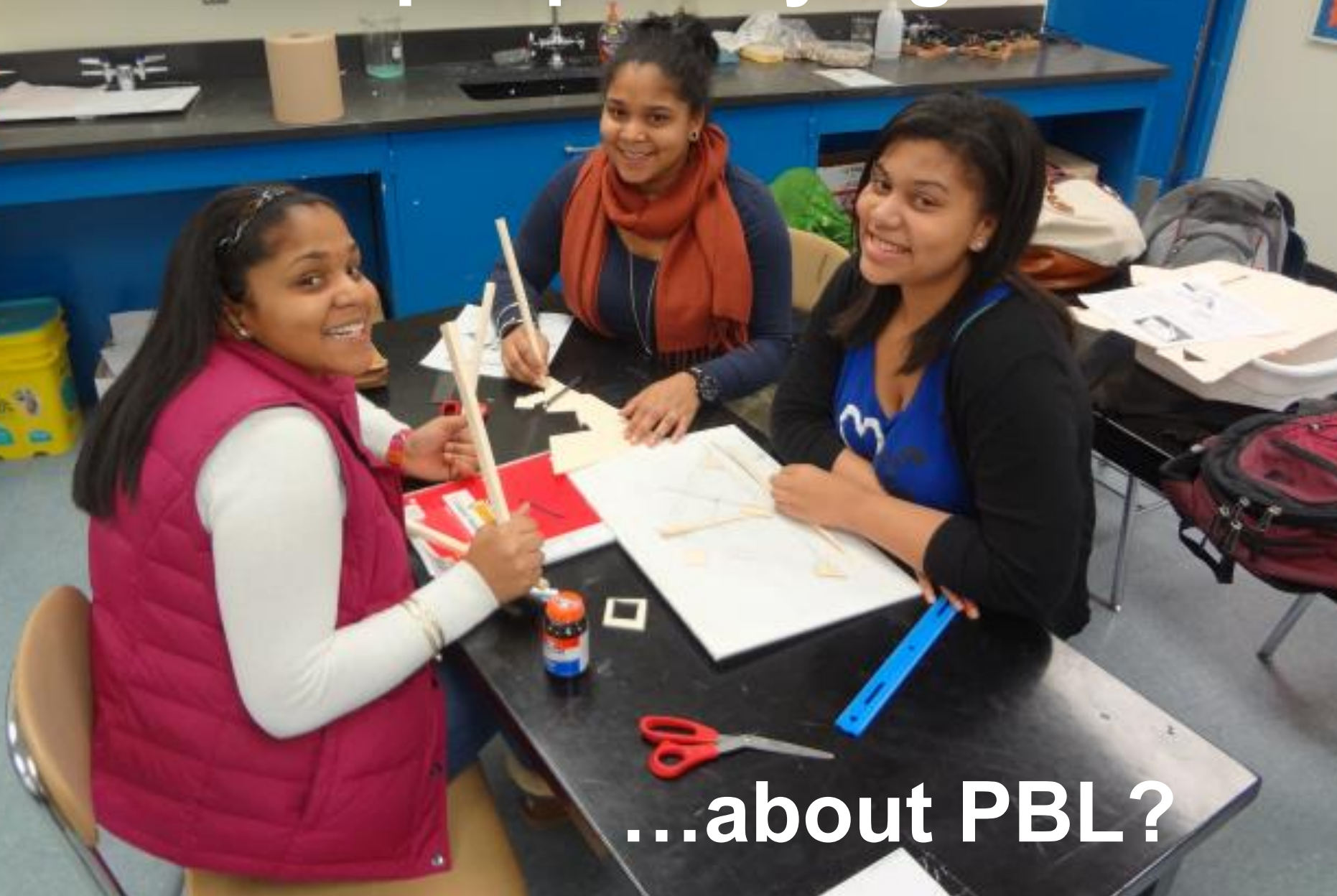
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PBL Projects Challenges



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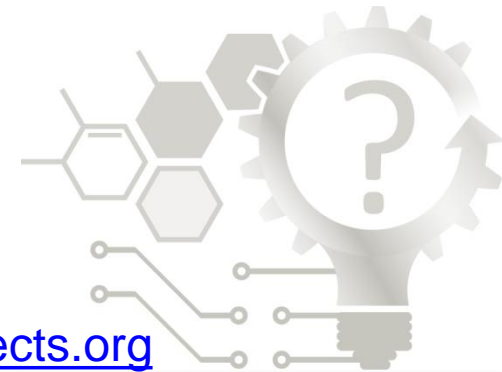
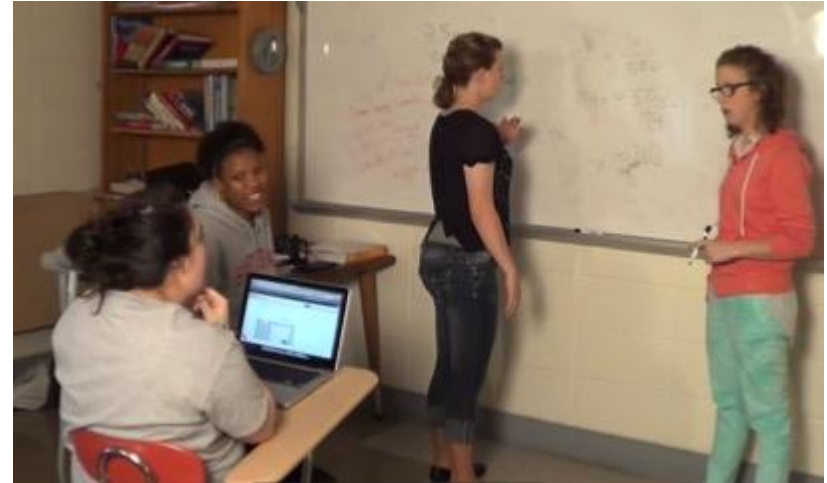
What are people saying...



...about PBL?

Student Testimonials

- **“My confidence increased...because unlike the task of solving textbook problems, I had the chance to learn and **apply what I learned to solve something real.**”**
 - Williamstown Middle and High School, Honors Physics Student, VT, AM PBL
- **“I felt like an actual scientist instead of just a student in high school.”**
 - Taft Union High School, Chemistry Student, CA, STEM PBL



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Industry and Instructor Testimonials

- “I enjoy using PBL in my classes because I can see how it gives the students a good **framework to solving any problem they encounter.**”

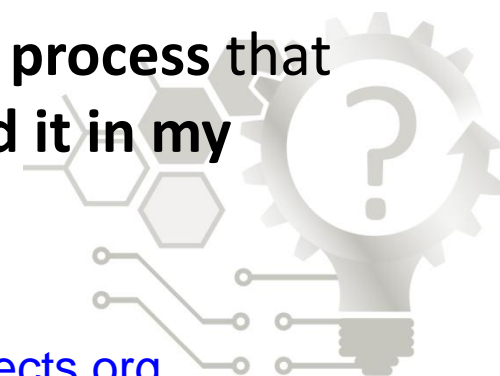
– Ponaganset High School, Technology Instructor, RI, STEM PBL and AM PBL



- “By following the structure of problem solving, it forces the discipline...to gather data. It’s really a **powerful process** that we’ve seen work exceptionally well. **I wish I had it in my career thirty years ago.**”

– Core Team Member, IBM, VT, AM PBL

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New Initiatives

PBL Resource Center

Sharing PBL resources

Providing professional development services

Engaging industry partners in STEM education



Professor at Norwich University in VT displays student findings after using PBL Challenges.

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Key Takeaways



Current and relevant technical skills

Critical thinking, problem solving & teamwork skills



Changing teacher practice to prepare students for workforce



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