Project-Based Learning -101 for CTE Teachers

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PBL Explained

• Buck Institute for Education
What is PBL?

What is project-based learning?

Project-based learning is a teaching method in which students gain knowledge and skills by working for an extended period of time to investigate and respond to a complex question, problem, or challenge.

bie.org
PBL consists of carefully designed problems that challenge students to use:

- Critical thinking
- Self-directed leaning Strategies
- Team participation skills
- Research techniques
- Disciplinary knowledge

PBL allows the learner to acquire an integrated, knowledge-based structure around real-world problems – problems the learner will face in future work, profession, community, and personal life.
What does project-based learning look like in the classroom?

- Problem
- Use scientific method
- Integrated content
- Collaborative
- Real-life
- Long-term
- Student-centered
- Engaged
- Investigation
- Purposeful
- Culminating event

- Prior knowledge
- Hands-on
- Application of skills to a problem
- Multiple subjects
- Critical thinking
- Communication
- Creativity
- Critical data
Why is PBL good for students?

PBL...
• Engages students
• Provides real-world relevance for learning
• Promotes retention of learning and application to new situations
• Fosters responsibility
• Builds confidence
• Produces problem solvers
• Enables collaboration
• Allows for communication of ideas
• Incubates creative innovators
• Connects students and schools with communities and the real world
PBL...

• Provides an effective way to address standards that emphasize real-world application and 21st century skills
• Fits well with modern technology
• May lead to rediscovering the joy of learning for students and teachers
• Nurtures rigor, quality of work, and high standards
• Lends itself to authentic assessment
• Promotes lifelong learners
• Accommodates students with varying learning styles and differences
• Is supported by research
Driving Question

PBL projects begin by presenting a driving question, one that focuses on intended learning objectives, aligns with students' skills, and appeals to student interests or authentic problem that creates a need to know the material.
PBL GOLD STANDARDS
PBL Hallmarks

• Projects form the centerpiece of curriculum – they are not an add-on or extra at the end of a “real” unit.
• Students engage in REAL-world activities and practice the strategies of authentic disciplines.
• Students work collaboratively to solve problems that matter to them.
• Technology is integrated as a tool for discovery, collaboration, and communication.
• Increasingly, teachers collaborate to design and implement projects on a global scale.
PBL Unit Life-Cycle

1. Project Launch
2. Driving Question
3. Product Development
4. Mini-Lessons
5. Culminating Event & Presentation
PBL Instructional Attributes

Problem
- Presents the criteria, challenge, or constraints for the project
- Driving Question(s)
- Project Launch

Products
- These are a specific set of products that students will create to demonstrate their acquisition of knowledge & skills
- Rubrics(s)
- Cooperative Learning

Presentation
- Identify audience for student presentations (academic, kids, business)
- Schedule informal or formal *public presentation* of the products that serve as answers or solutions to the original problem.
- Establish *reflection tools* for post project discussions (whole group, wikis, blogs)

Culminating Event
Doing Projects vs. Project Based Learning

Traditional Unit with Culmination Project
- Lecture
- Activity
- Quiz
- Lecture
- Activity
- Quiz
- Review
- Exam
+ Project

Project Based Learning Unit
- **Project Launch**
  - Engaging and authentic task designed to provide the context for learning
  - Activities
  - Workshops
  - Lectures
  - Homework
  - Research
  - Labs

- **Reflection**
  - Simulations
  - Discussions
  - Modelling
  - Reading
  - Interviews
  - Quiz

- **Benchmark**
  - Creating
  - Feedback
  - Building
  - Writing
  - Preparing
  - Drafts

- Culminating Event and Presentations
  - Authentic demonstration of deeper learning

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### Science

<table>
<thead>
<tr>
<th>DESSERT PROJECT</th>
<th>MAIN COURSE PBL</th>
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<tbody>
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<td>During a unit on microorganisms and disease, students are asked to research one disease and make a PowerPoint presentation about it to the class.</td>
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## DESSERT VS MAIN COURSE PBL

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<th></th>
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<td><strong>DESSERT PROJECT</strong></td>
<td><strong>MAIN COURSE PBL</strong></td>
</tr>
<tr>
<td>Students clip articles from the newspaper that contain evidence of statistical analysis and create a collage poster with them.</td>
<td>Students consider whether they and their peers use “too much” media by gathering data, analyzing the findings, and planning how to display and present their statistics and comment on their significance.</td>
</tr>
</tbody>
</table>
PBL Resources

BIE.org

PBL STARTER KIT
To-the-Point Advice, Tools and Tips for Your First Project
### Examples of Authentic Culminating Products

<table>
<thead>
<tr>
<th>Real-World Role</th>
<th>Real-World Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>Architect or contractor</td>
<td>Plan, drawings or model for a building or site; budget proposal</td>
</tr>
<tr>
<td>Businessperson or employee of a company</td>
<td>Business plan; proposal for improving business; set of guidelines for employees; annual report; written and/or oral report to supervisors or investors</td>
</tr>
<tr>
<td>Chef</td>
<td>Menu; plan for an event; demonstration of food preparation</td>
</tr>
<tr>
<td>Citizen</td>
<td>Letter to media or politician; speech to government body; issue campaign</td>
</tr>
<tr>
<td>City Planner</td>
<td>Plan for use of land; proposal for civic improvement</td>
</tr>
<tr>
<td>Consultants</td>
<td>Written or oral presentation of recommendations</td>
</tr>
<tr>
<td>Doctor or health care worker</td>
<td>Written or oral presentation of recommendations for improving or maintaining health; informational brochure or web page for patients</td>
</tr>
<tr>
<td>Engineer</td>
<td>Plan, drawings and/or model for a device, structure, system, etc. or an actual artifact</td>
</tr>
</tbody>
</table>
HOW DO I GET STARTED?
HOW DO I GET STARTED PLANNING PBL?

Begin with the END in mind!

What are the most important goals you have for student learning this year?

What student learning goals were NOT met this year through traditional instruction?
PBL Component...review

**Driving Question**

PBL projects begin by presenting a driving question, one that focuses on intended learning objectives, aligns with students skills, and appeals to student interests or authentic problem that creates a need to know the material.
HOW DO I GET STARTED PLANNING A PBL?

Frame a DRIVING QUESTION!

What’s going on in the world around us now that could frame your unit? Or, what’s interesting?

The best driving questions are provocative and challenging, accessible to students, open-ended with multiple possible answers, and linked to important content.
Life at its best is a series of challenges. A big enough challenge will bring out strengths and abilities you never knew you had. Take on challenges and you will bring yourself to life.
# The Driving Question

## A DRIVING QUESTION...

<table>
<thead>
<tr>
<th>FOR STUDENTS</th>
<th>FOR TEACHERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guides Project Work</td>
<td>Guides Planning &amp; Reframes</td>
</tr>
<tr>
<td>Creates Interest and/or the Feeling of Challenge</td>
<td>Content Standards or Big Ideas</td>
</tr>
<tr>
<td>Reminds Them “Why we’re doing this today”</td>
<td>Captures &amp; Communicates the Purpose of the Project</td>
</tr>
<tr>
<td></td>
<td>Initiates and Focuses Inquiry</td>
</tr>
</tbody>
</table>
Driving Question Example

- Pragmatic
- Speaks to student interest
- Includes a social, environmental, or moral cause
- Timeless
- Multi-cultural
- Addresses a specific audience
- Serves as a STEM for multiple “essential questions”

- How can I build a house?
- How can technology be used to build a house?
- How can technology be used to build an earth-friendly house?
- How can we design an environmentally efficient home using alternative energies for a local housing development city project?
  - What materials?
  - What time frame?
  - What is our budget?
  - How much space?
  - Will it be child friendly?

Know
---
Need to Know

Essential Questions
### Driving Question Tool

<table>
<thead>
<tr>
<th>LEAD in...</th>
<th>by WHO</th>
<th>action VERB</th>
<th>leads to (PRODUCTS)</th>
<th>for WHOM</th>
<th>for what PURPOSE.</th>
</tr>
</thead>
<tbody>
<tr>
<td>How can...</td>
<td>I</td>
<td>build...</td>
<td>real-world problem</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>we</td>
<td>create...</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>How do...</td>
<td>we</td>
<td>make...</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>as</td>
<td>design...</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>(roles)</td>
<td>plan...</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(occupations)</td>
<td>solve...</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Should...</td>
<td>town</td>
<td>write...</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>city</td>
<td></td>
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<tr>
<td></td>
<td>country</td>
<td>propose...</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Could...</td>
<td>state</td>
<td>decide...</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>nation</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>community</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>What...</td>
<td>organization</td>
<td></td>
<td></td>
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</tbody>
</table>
How do I make my projects authentic?

The easiest way to make a project **real** or **authentic** is to frame it in terms of an occupation or career based scenario. This will ensure that the DQ addresses a real problem with a need for real solutions.
Project Examples

1. Health Services Cluster
   - Research a problem related to ethics in human cloning. (Biotechnology Program)
   - Develop a disaster response plan for a hospital emergency room located near a chemical manufacturing plant. (Therapeutic Systems Cluster Health Program)

2. Industrial and Engineering Systems Cluster
   - A local food manufacturer is experiencing a high-rate of packaging failures of its condiment products. Troubleshoot the packaging failure and develop a more durable package. (Industrial Manufacturing Program)
   - Design a residential heating/air conditioning system for a 1500 square foot house in Brownsville, Texas. (Heating, Ventilation, Air Conditioning/Refrigeration Program)

3. Business and Management Cluster
   - Develop a marketing plan for a newly developed hair care product that will be marketed and sold via the Internet. (E-commerce Marketing Program)
   - Develop a computer-generated presentation, including animation, which promotes a Career-Technical program to prospective students and their parents. (Interactive Media Program)

4. Human Resources / Services Cluster
   - Develop an instructional unit for teaching Texas' mathematics content standards to middle school students. (Career Paths for the Reaching Profession Program)
   - Research a new fingerprinting technology to aid in criminal investigation. Provide training in the process to a local law enforcement agency. (Criminal Justice Program)

5. Arts and Communication Cluster
   - Develop a public service campaign to promote involvement in the arts for your city and surrounding community. (Radio and TV Broadcasting Program)
   - Design and present a creative packaging concept for a new fruit-flavored cereal product that appeals to young children. (Commercial Art Program)

6. Environmental and Agricultural Systems Cluster
   - Conduct an environmental impact study on the surrounding community of a proposed egg production farm. (Environmental Technology Program)
   - Research a farmer’s cropping plan to help improve yields. (Agriculture Production Program)
Welcome to EPICS

EPICS is a service-learning design program in which teams of students partner with local and global community organizations to address human, community, and environmental needs. EPICS was founded at Purdue University in Fall 1995.

Purdue University, West Lafayette, IN 47907-7960
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PBL Game

Goal:

• Learn the PBL operational definitions by reading, listening and speaking them

• Create your own game
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