Developing a Problem-Based Curriculum

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The well-educated individual is not a certified product but a self acquiring wisdom, with each step along the journey important in its own right.

John Goodlad
So, What’s Your Problem?

- Identify a problem around which you want to design and construct your PBL
- A problem found in the real world
- A problem that is open-ended
- A problem to which students can relate
- A problem to which you can define the educational standards to use
Problem-Based Learning (PBL)

- Carefully selected and designed open-ended problems
- Real world issues and scenarios
- Learner engaged in the process of acquiring critical conceptual knowledge and understandings
- Learner engaged in self-directed learning
- Learner engaged in collaborative teams
- Problem solving proficiency emphasized and developed
Brings Relevancy to the Classroom

- Inquiry-Based Multidisciplinary Approach
- Utilizes Computer Technology
- Focuses on Current Global Issues
- Integrates Effective Learning and Teaching Practices
Multidisciplinary Approach

- Political Domain
- Scientific Domain
- Social/Cultural Domain
- Economic Domain
Backward Planning Design

1. Identify concepts we want students to understand at end of program
2. Backward planning to develop appropriate activities to construct meaning
3. Implement program with appropriate activities
4. Students gain in knowledge and understanding
Standard Alignment in Curriculum

Goals

- Objective
  - Concept
    - Activity
      - Content
      - Method
  - Concept
    - Activity
      - Content
      - Method

- Objective
  - Concept
    - Activity
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Standard Alignment in Curriculum

Goal:
Sixth Grade (TEKS -6.8)
The student knows that complex interactions occur between matter and energy

Objective 1 - The student is expected to define matter and energy

- Demonstrated Understanding of Matter
  - Will it Float?
  - States of Matter

- Demonstrated Understanding of Energy
  - Wrecking Balls
  - Hands on

Objective 2 - The student is expected to explain and illustrate the interactions between matter and energy in the water cycle and in the decay of biomass such as in a compost bin

- Explain Interactions between matter and energy
  - Oobleck
  - Cooperative Grouping
  - Water Cycle
  - Socratic Questioning
  - Decay of Biomass

- Illustrate Interactions between matter and energy
  - Peel Out

Objective 1 - The student is expected to describe energy flow in living systems including food chains and food webs

- Describe Energy in Living systems
  - The Strongest
  - Food Chains
  - Food Webs
  - Body and Mind
  - Scaffold
  - Method
The Critical Thinking Curriculum Model

- Educational Components
- Technology Components
- Assessment Components
- Community Components
The Critical Thinking Curriculum Model

- Constructivism
- Socratic Dialogue
- Hands-on/Minds-on Activities
- Critical Thinking
- Collaborative/Cooperative Relationships
- Multidisciplinary Approach
- National & State Standards
The Critical Thinking Curriculum Model

- Technology Components
  - Desktop Software
  - Internet Software
  - Email and Collaborative Workspaces
  - Video and Images
  - Classroom Materials
  - Computer Hardware
  - Internet Connectivity
The Critical Thinking Curriculum Model

Assessment Components

- Discussions
- Classroom Assignments
- Tests and Quizzes
- Writings and Journals
- Electronic Portfolios
- Demonstrations
- Rubrics
The Critical Thinking Curriculum Model

Community Components

- Higher Education
- Research Laboratories
- Businesses
- Colleagues
- Family
- Electronic Mentors
Problem-Based Learning Diagrams

Unit on Matter and Energy

Educational Components
- Constructivism (5Es)
- Socratic Questioning
- Cooperative Grouping

Technology Components
- Internet/Email
- PPT/Web Sites
- Asynchronous Discussion Boards

Assessment Components
- Informal - Discussions
- Informal - Observations
- Formal - Presentations

Community Components
- Business Partners
- Scientists

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Problem-Based Learning Diagrams

- Goals
  - Objectives
    - Educational Components
    - Technology Components
    - Concepts
      - Assessment Components
      - Community Components
    - Activities
      - Content
      - Method

- Standards Alignment Y-Axis
- CTCM Alignment X-Axis
Problem-Based Learning Diagrams

Students will understand that electrical circuits provide a means of transferring electrical energy.

Students are expected to show a transfer of energy in electrical circuits when heat, light, sound and chemical changes are produced.

Concepts: energy sources, transformation of energy.

Building your own circuits in class.

Transfer of energy using light.

CTCM Alignment X-Axis

Assessment Components
- Formal Presentations using Rubric
- Informal Class Discussions

Community Components
- Electronic Mentors
- University Faculty

Educational Components
- Socratic Questioning
- Cooperative Groups
- Multidisciplinary Approach

Technology Components
- Computer Software
- Web Sites

Cooperative groups
Research in Antarctica

IPY-ROAM: International Polar Year Research and Educational Opportunities in Antarctica for Minorities

IPY-ROAM Antarctica - http://ipyroam.utep.edu/

University of Texas at El Paso, TX, USA
Research in Antarctica
Unlocking Student Success Utilizing Critical Thinking and Inquiry

“No matter if the students liked science or not, enjoyed computers or not, the PBL & CTCM approach has helped to increase science content understanding and problem solving abilities.”
Developing a Problem-Based Curriculum

Thanks for your cooperation and participation! Questions?

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