Developing Problem-Based Learning Science Lessons for Local Contexts

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Developing PBL for Local Contexts
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Why Problem-Based Learning?

- Preparation for real world problems?

- PBL shown to improve content knowledge, critical thinking skills, & students’ self-efficacy

- Adaptable to classrooms with or without laboratories, internet access
Problem-Based Learning

- Origins in Medical Education – clinical reasoning
- Collaborative inquiry-based learning strategy
- Story presents as Authentic, Ill-defined problem
  - Real-world phenomena
  - Story includes extraneous information, lacks all facts needed
- Systematic structure for analyzing and learning about problem
  - What do we know?
  - What do we need to know?
  - Hypotheses

Developing PBL for Local Contexts
PBL Framework for Analyzing Problems

Developing PBL for Local Contexts
PBL in the Science Classroom Series

- Contain PBL lesson plans for K-12 classrooms
  - Three main science disciplines
  - Aligned with NGSS (USA)
  - Problems testing with teachers and students in wide range of ages

- Chapter 9 – “Modifying and Designing Your Own Problems”

Developing PBL for Local Contexts
The Importance of Context
Developing PBL Problems for Local Contexts

- Important for teachers/developers to create NEW PBL problems for local contexts!
- Connect to phenomena relevant to learners
- Cultural and environmental relevance
- Language – colloquialisms and idioms
- Assessments that meet local/national standards
Steps in Developing PBL Problems

- Selecting a topic
- Writing assessments
- Writing a story
- Integrating investigations
- Identifying potential resources
- Writing a model solution
Sample Problem - “Seeing the Forest for the Trees”

Page 1: The Story

Seeing the Forest for the Trees

Stephen was talking with his friends as they walked to school. “Did you see the people planting more trees at the edge of the forest yesterday? There’s another group here talking about deforestation again, and they’re trying to talk my father into planting some trees in his fields. My father is not sure he wants to do that. It will mean planting fewer crops next season.”

“They spoke with my family, too,” said Annette. “I want to see more trees, but it will mean less money for my family. I don’t think they’ll get many people to help them with the reforestation project.”

“Some of us are doing it,” said William. “My family did this last year. We planted cashews. In a couple of years, we can start and make sell the nuts and fruit.”

Jeannine also spoke up. “My family talked with the forestry service, too. They would rather have farmers plant a variety of native trees and find ways to make money from a natural forest. I think it’s all very confusing.”

Stephen was curious. He wondered what the best choice for his family might be. His father is not sure what to do, and maybe Stephen can help make a decision.

Your Challenge:

Make a recommendation to Stephen’s father about ways to support reforestation while still maintaining a strong local economy. Include at least two possible suggestions, with reasons why each might be a good plan.
Sample Problem - “Seeing the Forest for the Trees"
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Page 3: Resources

Seeing the Forest for the Trees

Agroforestry in Kenya:
http://www.worldagroforestry.org/country/kenya

Agriculture for Impact:
https://ag4impact.org/sid/ecological-intensification/diversification/multiple-cropping/

Benefits of Coffee-Banana Intercropping:

Matchmaking for Coffee:
Discussion

- Training educators and developers to design PBL problems
- Teaching teachers to implement the lessons
- Research on the effectiveness of PBL as a transformative pedagogy
- Sharing what works!
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