

## **Family Secrets**

### **Problem Based Learning Main Concepts**

#### **What is Problem Based Learning?**

Problem based learning (PBL) is an instructional approach which enables learners to simultaneously develop problem solving strategies, disciplinary knowledge, and research skills. Students become active problem solvers confronted with an ill-structured problem which mirrors real world problems.

PBL begins with the introduction of an ill-structured problem on which all learning centers. Teachers assume the role of cognitive coaches rather than knowledge disseminators. Students assume the role of active problem-solvers, decision-makers, and meaning-makers rather than passive listeners.

PBL is an appropriate curriculum and instructional approach because it:

- Requires students to be more engaged in learning
- Offers students an obvious answer to the questions "Why do we need to learn this information?" and "Does what I am doing in school have to do with anything in the real world?"
- Stimulates critical and creative thinking by suspending the guessing game of "What's the right answer the teacher wants me to find?"
- Promotes self-regulated learning by asking students to generate their own strategies for problem definition, information gathering, data-analysis, hypothesis-building and hypothesis-testing
- Promotes metacognition by encouraging students to compare and share learning strategies
- Engages students in learning information in ways that are similar to adult learning situations
- Assesses learning in ways which demonstrate understanding and not mere rote recall.

#### **What is the Teacher's role in PBL?**

In PBL the teachers is a coach who:

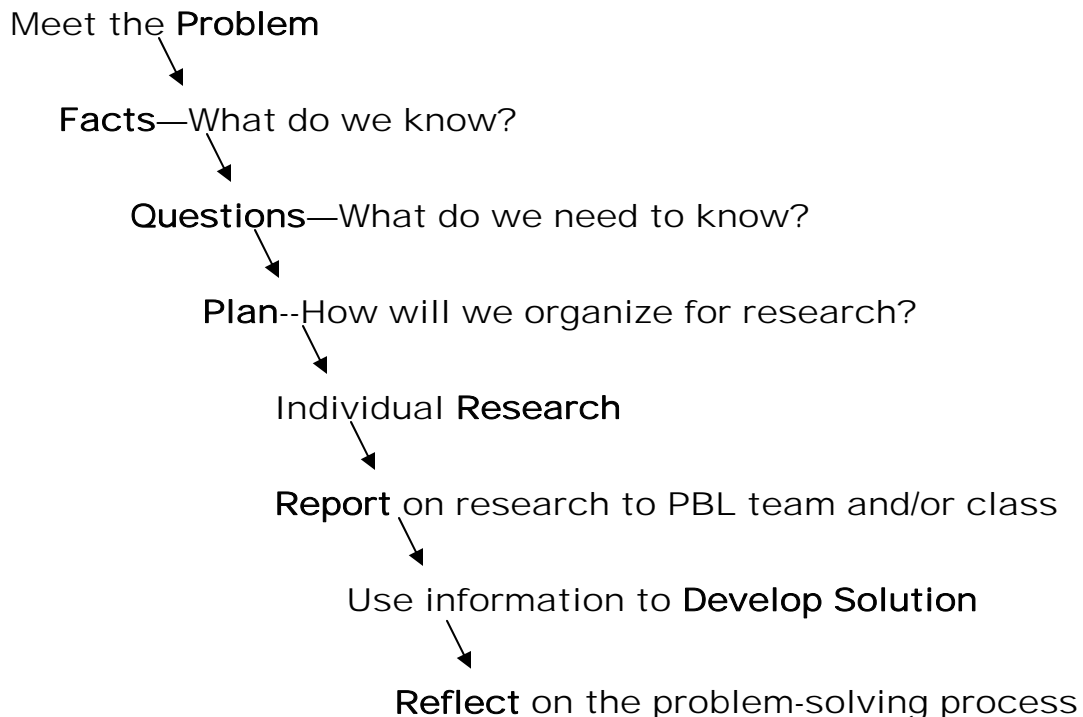
- Presents the problematic situation
- Models, coaches, questions, listens, and remains in the background
- Engages in the process as co-learner
- Assesses learning

#### **What is the Student's role in PBL?**

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Students need to take an active role in the learning process. They are presented with a problem (case, research paper, video tape, for example). Throughout the PBL, students are continually encouraged to:

- Define what they know-and more importantly, what they don't know.
- Pose questions on aspects of the problem they do not understand. These questions are recorded by the group.
- Decide which questions will be followed up by the whole group, and which questions can be assigned to individuals, who later teach the rest of the group.
- Discuss what resources will be needed in order to research the answers to the questions, and where they can be found.
- Research the answers to their research questions and integrate this information into the context of the problem.
- Summarize their research and explain what they have learned to group members.
- Work as a group to integrate, apply, and use the information from group members to arrive at a solution.
- Define new learning issues and see that learning is an ongoing process.
- Reflect on the problem-solving strategies used by their group.



### What are the characteristics of an effective PBL activity?

- Real-world authenticity

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- A motivational dimension
- An expectation that the students will make and defend judgments or decisions based on the information they acquire
- Cooperation between learners
- Initial open-ended questions that elicit diverse opinions
- Application of prior knowledge to the learning of new concepts
- New concepts from diverse areas which are interconnected

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### **Problem Based Learning Resources**

#### **Books on Problem Based Learning:**

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##### **How to Use Problem-Based Learning in the Classroom**

by Robert Delisle

ASCD, 1997

ISBN: 0871202913

Available in print or E-book format from ASCD Publications at

<http://www.ascd.org/publications/books/197166.aspx>

##### **Problems as Possibilities: Problem-Based Learning for K-16 Education 2<sup>nd</sup> Edition**

by Linda Torp , Sara Sage

ASCD, 2002

ISBN: 0871205742

Available in print form from ASCD Publications at

<http://www.ascd.org/publications/books/101064.aspx>

##### **The Power of Problem-Based Learning**

by Barbara Duch, Susan Groh, and Deborah Allen

Stylus Publishing, 2001

ISBN: 1579220363

##### **Thinking Toward Solutions: Problem-Based Learning for General Biology**

by Deborah Allen and Barbara Duch

Brooks Cole, 1998

ISBN: 0030250331

##### **Analyzing Issues: Science, Technology, and Society**

by Don Galbraith, Linda McClelland, Penny McLeod, Gwen Johansson

Trifolium Books Inc., 1997

ISBN: 1895579-333

##### **Decisions Based on Science**

by Vincent Campbell, Jocelyn Lofstrom, Brian Jerome

NSTA, 1997

ISBN: 0873551656

May be ordered from: <http://store.nsta.org/>

##### **Society and Science: Decision-Making Episodes for Exploring Society, Science, and Technology**

by Nancy Stahl and Robert Stall

Addison-Wesley Publishing Company, 1995

ISBN: 0201490978.

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### **Internet Resources:**

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#### **University of Delaware Problem-Based Learning website**

At <http://www.udel.edu/pbl>

*Highly recommended. Includes many sample problems and links to other PBL sites*

#### **National Center for Case Study Teaching in Science website**

At <http://ublib.buffalo.edu/libraries/projects/cases>

*Highly recommended. Includes many sample problems and links to other PBL sites*

#### **Tutorial on Problem Based Learning**

<http://www-ed.fnal.gov/trc/tutorial/pbl.html>

Concise summary including introduction, characteristics, benefits, potential problems, and PBL questioning.

#### **PBL Network**

<http://www2.imsa.edu/programs/pbl/cpbl.html>

Information on "What is PBL?," sample PBL problems, and current research.