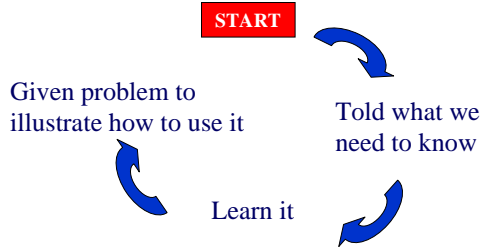




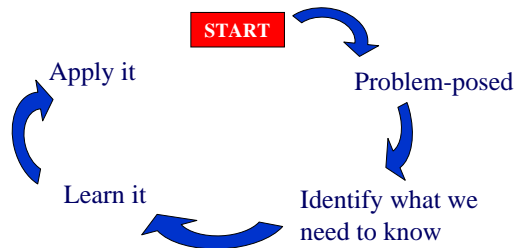
### PBL Contrasted with Subject-Based Learning



*From Smith et al, 2005. Pedagogies of engagement: Classroom-based practices. J. Engineering Education, January 2005, 87-101.*



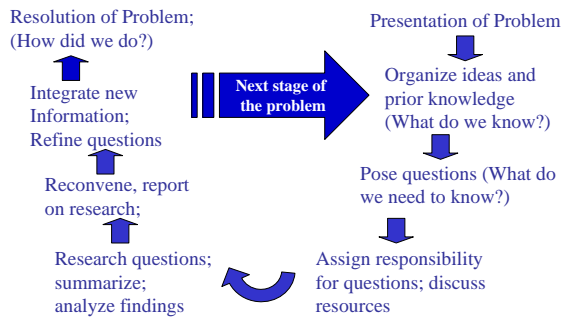
### PBL Contrasted with Subject-Based Learning



*From Smith et al, 2005. Pedagogies of engagement: Classroom-based practices. J. Engineering Education, January 2005, 87-101.*



### PBL: The Process



### Types of Learning Objectives

**Content-oriented:** subject specific

- Basic knowledge and understanding of specific concepts, techniques, etc. in the discipline

**Process-oriented:** global skills

- Effective communication: oral and written
- Acquiring and evaluating information
- Working effectively with others
- Higher order, critical thinking



### Medical School Model

- Dedicated faculty tutor
- Groups of 8-10
- Very student-centered environment
- Group discussion is primary class activity

**A good choice for:**

- Highly motivated, experienced learners
- Small, upper-level seminar classes



### Typical Medical School PBL Problem: High Degree of Authenticity

Patient arrives at hospital, ER, physician's office presenting with symptoms X, Y, Z

*What questions should you ask?*

*What tests should you order?*

Physician interviews patient, receives results of tests

*Differential diagnosis*

*Preferred therapy*



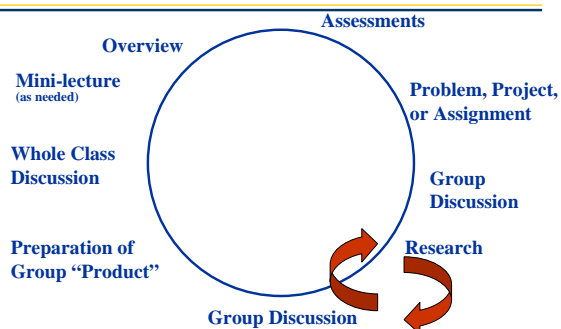
## “Hybrid” PBL

Non-exclusive use of problem-driven learning in a class  
May include separate lecture segments or other active-learning components  
Floating or peer facilitator models common

*Often used as entry point into PBL in course transformation process*



## Problem-Based Learning – Hybrid Model



## Hybrid Models of PBL



## Another Type of Hybrid Model



## Introductory Biology – An Example for Small Enrollment Courses

Course is one section of multi-section 2-semester survey course for science and allied health majors

6-7 PBL problems per semester  
Session time ranges from 75 - 120 min.  
PBL activities comprise 85-90% of total course time  
4-5 student groups of up to 6 students  
1 peer facilitator (junior or senior) per group

(same model also used in upper division bio course)



## General Chemistry: An Example of a Hybrid Model

Problem-based group work	40%
Lecture/whole-class discussion	50%
Demonstrations	7%
Other (Exam, lab review)	3%

Source: Susan Groh, Ph. D., Department of Chemistry & Biochemistry, University of Delaware

## Overview of Additional Models

---

### Biology

- 4 problems per semester (2 ½ periods each)
- 2 lecture days, 1 PBL day per week

### Criminal Justice

- 1 two-week problem on important course content

### Many courses

- PBL activities in discussion, lab

## PBL Models for Undergraduate Courses

---

### Medical School Model

*Small class, one instructor to 8-10 students*

### Floating Facilitator Model

*Small to medium class, one instructor, up to ~75 students*

### Peer Facilitator Model

*Small to large class, one instructor and several peer facilitators*

### Large Class Models

*Floating facilitator and hybrid PBL/other activities*

## Floating Facilitator Model

---

Instructor moves from group to group:

- Asks questions, directs discussions, checks understanding

Group size: 4

More structured format:

- Greater degree of instructor input into learning issues and resources

Other class activities:

- Groups report out
- Whole class discussions
- (Mini-)lectures

*A good choice for:*

- Less experienced learners
- Classes of all sizes

## Dealing with Large Classes

---

**Using PBL with large classes (> 100 students) presents special challenges, but can be successful.**

Consider hybrid PBL or floating/ peer facilitator models  
Peers, TA's help extend instructor's presence

In fixed seating lecture hall, keep some rows unoccupied for better access to all groups.

Use a more teacher-centered, structured format

Incorporate guiding questions into problems

- Interrupt group activity more often for
- Discussion of learning issues
  - Reporting out to whole class

Group grading (vs. individual papers/projects can reduce grading burden.

Consider visual (readily graded) assessments (graphs, diagrams, concept maps, etc.)

## Peer Facilitator Model

---

Advanced undergraduates serve as facilitators

- Help monitor group progress and dynamics
- Serve as role models for novice learners
- Capstone experience for facilitator

Instructor's role

- Gives orienting lectures
- Leads whole class discussions
- Works with facilitators behind the scenes

## Strategies Typically Used to Teach a PBL Problem

---

- 1) "Mini" lecture to introduce problem
- 2) Instructor provided input at regular intervals
- 3) Mechanism for groups to compare notes
- 4) Instructor circulated amongst the groups
- 5) Instructor provided some resources
- 6) Problem constructed to allow for 1-5
- 7) Problem constructed to provide learner prompts for PBL novices