Introduction to POGIL: The Fundamentals

Welcome!
Please sit in groups of three or four, with people you do not know, and make the groups as heterogeneous as possible.

Getting Started
Managers: Look in the red folder. Read and carry out the Instructions to Managers.

Introduction to POGIL: The Fundamentals

• The Facilitation Team
• Tammy Pirmann, Springfield Twp HS
Objectives and Outcomes

This session is designed for those with limited or no previous exposure to POGIL. Participants will:
• Engage in POGIL activities
• Observe facilitation strategies
• Learn about POGIL implementation at other schools
• Discuss common barriers to implementation

Objectives and Outcomes

After attending this session, participants will be able to:
• Name crucial elements of POGIL pedagogy and philosophy
• List desirable student learning outcomes from a POGIL classroom
• Create strategies to begin implementing POGIL in their classrooms

The POGIL Project

• Launched by sequential National Science Foundation (2003-2012) and other grants
• Based on curricular work done by a variety of like-minded people in the mid-1990s
• Became a not-for-profit organization in 2010
• The mission of The POGIL Project is to connect and support educators from all disciplines interested in implementing, improving, and studying student-centered pedagogies and learning environments.
The POGIL Project

• The POGIL Project is run by:
  • A Board of Directors
  • A Director (Rick Moog, Franklin & Marshall College)
  • A Steering Committee of experienced practitioners (eight college and high school faculty)
  • Eight part-time and full-time staff in POGIL National Office (Lancaster, PA)

The POGIL Project

• Offers faculty development
  – More than 20 workshops each year for high school and college faculty
  – Institutes for workshop facilitators
• Actively involves almost 1,000 individuals each year
  – Workshop attendees, workshop facilitators, curriculum developers
• Has touched thousands of people
  – More than 1,000 people are implementing POGIL pedagogy across multiple disciplines

Real / Ideal Classroom Activity

• Draw two lines on a blank piece of paper
• Label the drawing as shown at the right
• Think about a particular class that you are teaching or have taught recently
Your Real and Ideal Classroom

- In the upper two quadrants, list 3-5 verbs which describe what your students do (real), or what you would like them to be doing (ideal) during a typical class.
- You may not use the word “learn” or synonyms of the word “learn”.

Real Class Ideal Class

Students

Teacher

Your Real and Ideal Classroom

- In the lower two quadrants, list 3-5 verbs which describe what you, as a teacher do (real), or what you would like to do (ideal) during a typical class.
- You may not use the word “teach” or synonyms of the word “teach”.

Real Class Ideal Class

Students

Teacher

Real and Ideal Reporting Out

- Real Student Verbs
- Ideal Student Verbs
Real and Ideal Reporting Out

- Real Teacher Verbs
- Ideal Teacher Verbs

Barriers to the Ideal Classroom

- Individually, identify barriers which prevent your “real” class from being “ideal”
- As a group, identify your top three barriers from the individual responses at your table
A POGIL Classroom Experience

Comprehension Question
Assume that in Model 2 the Pension Fund purchases insurance for $2 billion/year from Bank B. In this case, how much profit or loss will the pension fund have made at the end of five years, assuming that Bank A fulfills its obligation?

1. $10 billion profit
2. $5 billion profit
3. $2.5 billion profit
4. $0 profit
5. $10 billion loss

Whole Class Discussion
Incorporate reporting out of answers in a POGIL classroom.
Reflector’s Report

Reflectors, report to your group:
• One strength of the group and why it is important for an effective group
• One area of improvement for the group and a possible way to make it (2 minutes total)

Sharing Your Reflector’s Report

Any volunteers willing to share your Reflector’s Report with the workshop participants?

Student Outcomes

Other than content knowledge, what might your students gain from this type of learning environment?
• Individually: 1 minute
• Group: 3 minutes
• Presenters report out
Take a Break

We will reconvene at 10:15

What is POGIL?

Process Oriented Guided Inquiry Learning

Process Oriented (Cooperative Learning): Develop Key Process Skills

Process Oriented Guided Inquiry Learning
Process Skills

- Information Processing
- Critical Thinking
- Problem Solving
- Communication
- Teamwork
- Management
- Assessment

What is POGIL?

Guided Inquiry (Constructivism): Learning Cycle Activities

Process Oriented Guided Inquiry Learning

Learning Cycle Activities

induce

Invent

Explore

Apply

Orient

Close

deduce
What is POGIL?

Process Oriented (Cooperative Learning): Develop Key Process Skills

Guided Inquiry (Constructivism): Learning Cycle Activities

Process Oriented Guided Inquiry Learning

Information Processing Model

Events Observations Instructions Instructors

Perception Filter

Working Memory

Dealing

Neurons

Long-term Memory

Semantic

Syntax

Knowledge

Previous Knowledge Preferences Misconceptions

Diagnosis

Lives Distilled

Constructivist Model of Learning

"Learning is not the transfer of material from the head of the teacher to the head of the learner intact, (but) the reconstruction of material in the mind of the learner."

"It is an idiosyncratic reconstruction of what the learner ... thinks she understands, tempered by existing knowledge, beliefs, biases, and misunderstandings."

New Paradigm

• Knowledge results only through active participation in its construction.
• Students teach each other and they teach the instructor by revealing their understanding of the subject.
• Teachers learn by this process . . . by steadily accumulating a body of knowledge about the practice of teaching.

Teaching is enabling.
Knowledge is understanding.
Learning is active construction of subject matter.


Guided Inquiry Approach

• Students work in groups
• Students construct knowledge
• Activities use the Learning Cycle paradigm
• Students teach, discuss and learn from other students
• Instructors facilitate learning

Meta Activities

Meta-Activity: Process Skills
• Complete page 1 and wait for your assignment for Model 2 (8 min.)
• Report out (4 min.)
Meta Activities

The instructor in the classroom facilitates the development of process skills
- Complete the Meta Activity: Classroom Facilitation (6 min)
- Report out

Exploring the POGIL Activity Structure

Complete Quadrilaterals & Parallelograms Activity

Learning Cycle

- Parallels the "scientific method"
- Provides context for introduction of new terms
- Explicitly provides opportunities for critical thinking


Analysis of Student Outcomes

Data on the use of POGIL in a variety of academic settings

General Chemistry at Franklin & Marshall College

- "Lecture": F1990–S1994: n = 420
- Sections of approximately 24 students
- Same instructors
- Students randomly placed Fall semester and designate preference Spring semester (but not guaranteed to get their choice)
- Compare course grades (ABC’s vs. DFW’s)

Data from classrooms of Moog, Farrell, and Spencer

Organic Chemistry at a Regional Liberal Arts College

- Two sections--one lecture style, one POGIL--taught at the same time
- Students randomly placed in sections
- Common exams prepared and graded by both instructors
- Compare course grades (ABC’s vs. DFW’s)

Organic Chemistry at a Regional Liberal Arts College

Randomized enrollment, different instructors, single exam given concurrently, prepared and graded by both instructors

Organic Chemistry 1 at a Large Public University

- Two sections--one lecture, one POGIL--taught at the same time
- Students randomly placed in sections
- Compare withdrawal rate and common exam scores
  - Final exam created solely by lecture instructor and administered to both groups
Organic Chemistry 1 at a Large Public University

Withdrawals & Common Final Exam Scores, Fall 2000

Organic Chemistry 2 Pre-Quiz at a Large Public University

- Classes of about 250
- Unannounced quiz given on first day of Organic 2 (written by a non-POGIL instructor)
- Students had taken Organic 1
  - With lecture (two different instructors)
  - With POGIL

Organic Chemistry 2 Pre-Quiz Results (Lecture vs. POGIL Organic 1)

- Chi squared = 19.1  Alpha < 0.005

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Questions?

- Take one minute to write down any questions that you have, then think about which question is most important to you.
- As a group, take three minutes to discuss your questions and come up with a list of up to three questions you would like to ask, in rank order of importance.
- Answers to many questions are in the blue booklet

Wrap Up