Process Oriented Guided Inquiry Learning (POGIL):
A Student-Centered Approach to Instruction

Chicago Symposium Series on Excellence in Teaching Mathematics and Science: Research and Practice
Northwestern University
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The POGIL Project

- Launched by sequential grants from National Science Foundation (2003-2012)
- 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.

A POGIL Classroom Experience

What is POGIL?

- Process Oriented
- Guided Inquiry Learning
- Cooperative Learning:
  - Develop Key Process Skills

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
What is POGIL?

Process Oriented Guided Inquiry Learning

Process Oriented Guided Inquiry Learning

Learning Cycle Activities

Induce

Deduce

Invent

Explore

Apply

Orient

Close

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."


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
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 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
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Available Materials

John Wiley & Sons
  • General Chemistry
  • GCIB
  • Analytical Chemistry
  • Quantum Chemistry
  • Calculus I

Cengage/Brooks Cole
  • Organic Chemistry
  • Prep Chemistry

Pacific Crest
  • Biochemistry
  • Physical Organic Chemistry

Pearson
  • Intro to Materials Engineering
  • The POGIL Project
  • Thermo and Kinetics
  • Anatomy & Physiology

Flinn Scientific
  • HS Chemistry
  • HS Biology
  • AP Biology

Coming Soon:
  • Computer Science
  • AP Chemistry
  • Pre-Calculus

2014 POGIL Regional Workshops

• Mon June 30 – Wed July 2: Tacoma, WA
• Wed July 9 – Fri July 11: Colorado Springs, CO
• Mon July 14 – Wed July 16: St. Paul, MN
• Tue July 15 – Thu July 17: Conway, AR
• Fri July 25 – Sun July 27: Easton, MA
• Tue July 29 – Thu July 31: Johnson City, TN

• Apply at www.pogil.org $375 plus $100 for housing

Numerous workshops at BCCE also!