


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.

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Getting Started

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



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Introduction to POGIL: The Fundamentals

- The Facilitation Team
- Tammy Pirmann, Springfield Twp HS

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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

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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

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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.

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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)

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The POGIL Project

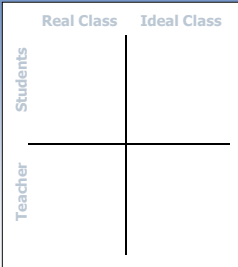
- Offers faculty development
 - More than 20 workshops each year for high school and college faculty
 - Institutes for workshop facilitators
- Actively involves almost 1,000 individuals each year
 - Workshop attendees, workshop facilitators, curriculum developers
- Has touched thousands of people
 -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


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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

	Real Class	Ideal Class
Students		
Teacher		




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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		

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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		

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Real and Ideal Reporting Out

- Real Student Verbs
- Ideal Student Verbs

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Real and Ideal Reporting Out

- Real Teacher Verbs
- Ideal Teacher Verbs

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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

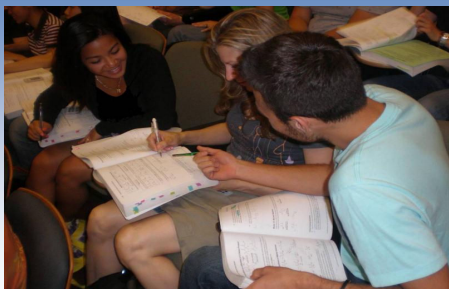
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Real and Ideal Reporting Out

Barriers to the Ideal Classroom

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A POGIL Classroom Experience



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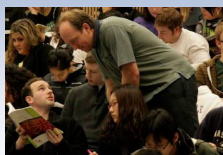
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Comprehension Question

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



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Whole Class Discussion

Incorporate reporting out of answers in a POGIL classroom.



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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)




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Sharing Your Reflector's Report

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




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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

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Take a Break

We will reconvene at 10:15

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What is POGIL?

Process Oriented Guided Inquiry Learning

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What is POGIL?


Process Oriented (Cooperative Learning):
Develop Key Process Skills

Process Oriented Guided Inquiry Learning

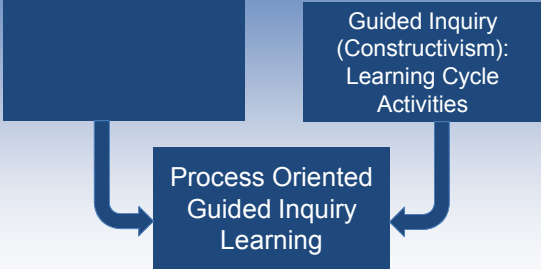
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Process Skills

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


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What is POGIL?

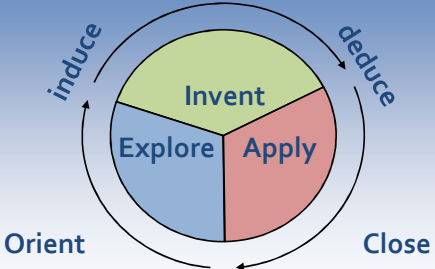


Guided Inquiry (Constructivism):
Learning Cycle
Activities

Process Oriented
Guided Inquiry
Learning

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Learning Cycle Activities



induce

deduce


Invent

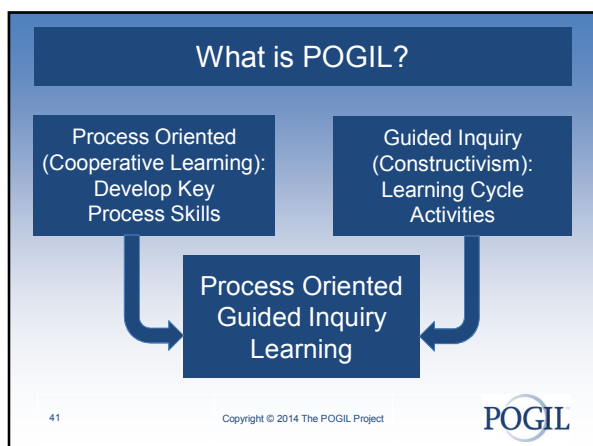
Explore

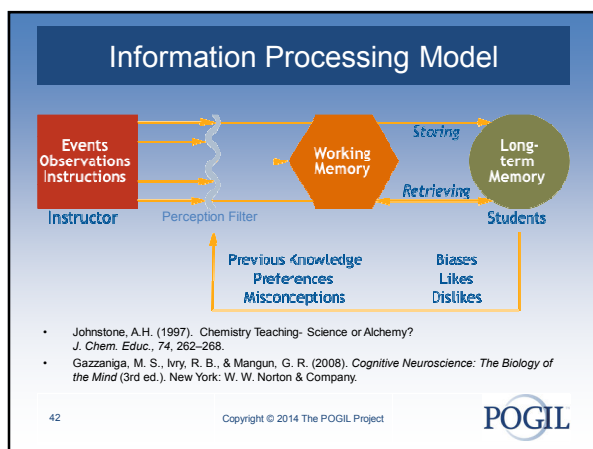
Apply

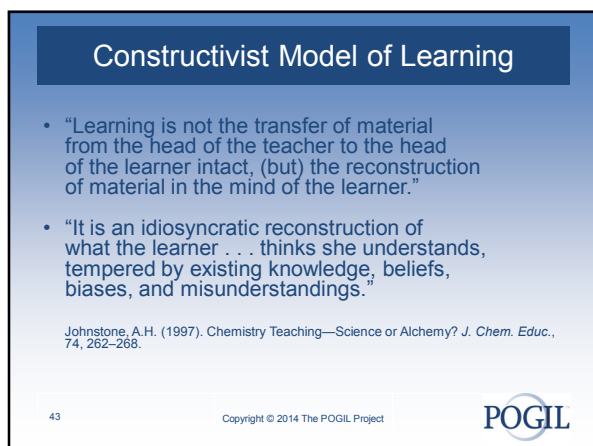
Orient

Close

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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.**

Elmore, R. F. (1991). Foreword. In C.R. Christensen, D.A. Garvin, & A. Sweet (Eds.), Education for Judgment (pp. ix-xi). Boston, MA: Harvard Business School Press.

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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


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Meta Activities

Meta-Activity:
Process Skills

- Complete page 1 and wait for your assignment for Model 2 (8 min.)
- Report out (4 min.)




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Meta Activities


The instructor in the classroom facilitates the development of process skills


- Complete the Meta Activity: Classroom Facilitation (6 min)
- Report out

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Exploring the POGIL Activity Structure

Complete Quadrilaterals & Parallelograms Activity




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Learning Cycle

Exploration $\xrightarrow{\text{INDUCTIVE}}$ Concept Introduction (Term Introduction) $\xrightarrow{\text{DEDUCTIVE}}$ Application

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

Karplus, K. & Thier, H.D. (1967). *A New Look at Elementary School Science*. Chicago: Rand McNally and Co.
 Piaget, J. (1964). Part I: Cognitive development in children: Piaget development and learning. *J. Res. Sci. Teach.*, 2, 176-186.

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Analysis of Student Outcomes

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

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General Chemistry at Franklin & Marshall College

- "Lecture": F1990–S1994: n = 420
- POGIL: F1994–S1998: n = 485
 - 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)

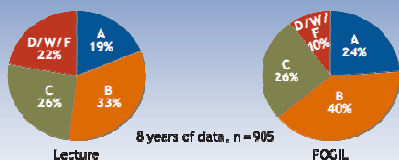
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General Chemistry at Franklin & Marshall College

Data from classrooms of Moog, Farrell, and Spencer



Chi-squared = 42.8; alpha < 0.005

Farrell, J.J., Moog, R.S., & Spencer, J.N. (1999). A Guided Inquiry Chemistry Course. *J. Chem. Educ.*, 76, 570–574.

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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)

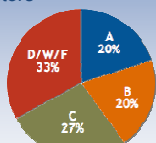
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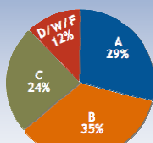


Organic Chemistry at a Regional Liberal Arts College

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



Lecture



POGIL

Chi-squared = 77.1; alpha < 0.01

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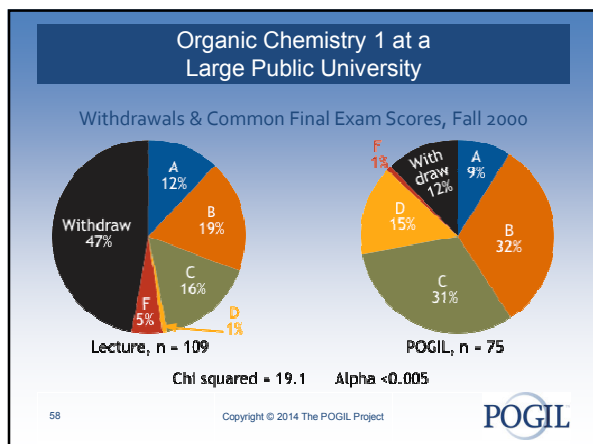
Organic Chemistry 1 at a Large Public University

- 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

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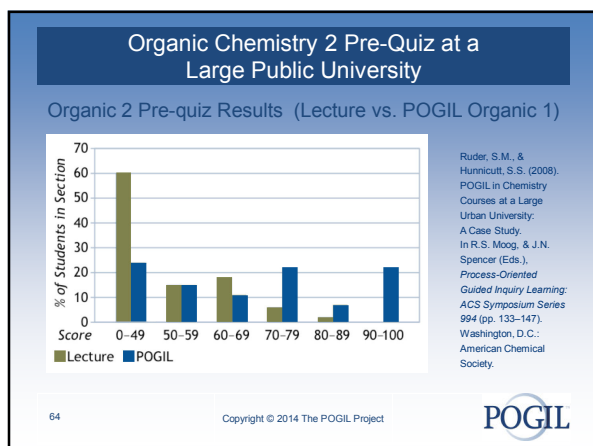




Organic Chemistry 2 Pre-Quiz at a Large Public University


- 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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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

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Wrap Up

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