

**PRISM**

**Problems & Research to Integrate Science & Mathematics**  
Emory University & Clark Atlanta University, Atlanta, GA

# Putting PBL in Your GK-12

**A Special Interest Session at the  
NSF GK-12 Projects Annual Meeting, March 27-29, 2009**

Pat Marsteller<sup>1</sup>, Jordan Rose<sup>1</sup>, George Watson<sup>2</sup>,  
Jeff Spraggins<sup>3</sup>, Neil Milan<sup>4</sup>, and Cris Hellerstein<sup>5</sup>

<sup>1</sup>Center for Science Education, Emory University, Atlanta, GA

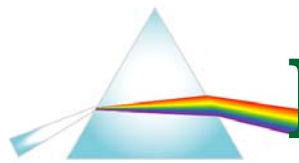
<sup>2</sup>Dean's Office, College of Arts and Sciences, University of Delaware, Newark, DE

<sup>3</sup>Department of Chemistry and Biochemistry, University of Delaware, Newark, DE

<sup>4</sup>Population Biology Evolution and Ecology, Emory University, Atlanta, GA

<sup>5</sup>Decatur High School, Decatur, GA

<http://www.prism.emory.edu>



**PRISM**

**Problems & Research to Integrate Science & Mathematics**  
Emory University & Clark Atlanta University, Atlanta, GA

# All Your Questions Answered...

- What does PBL look like?
- How does Emory use PBL?
- How does Delaware use PBL?
- How do K-12 students, teachers, graduate students respond?
- Where you can find PBL lessons?

<http://www.prism.emory.edu>

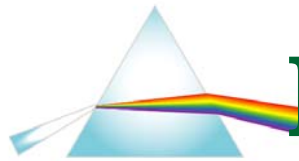


# PRISM

Problems & Research to Integrate Science & Mathematics  
Emory University & Clark Atlanta University, Atlanta, GA



<http://www.prism.emory.edu>



# PRISM

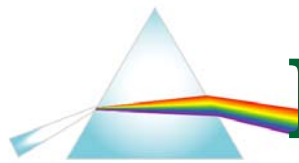
**Problems & Research to Integrate Science & Mathematics**  
Emory University & Clark Atlanta University, Atlanta, GA

## PRISM

- developing a community of educators working to transform K-16 science and mathematics education through experiences in:
  - *Problem-based learning pedagogy and curriculum development*
  - *Reflective teaching practices*
  - *Teaching/mentoring experiences with K-12 students*
  - *Dissemination of educational scholarship*
  - *Opportunities for leadership*

# PRISM

<http://www.prism.emory.edu>



**PRISM**

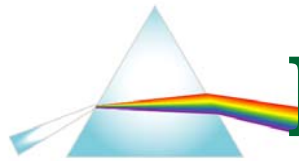
**Problems & Research to Integrate Science & Mathematics**  
Emory University & Clark Atlanta University, Atlanta, GA

# Why PRISM uses Problem-Based Learning

- *active, collaborative, student-centered*
- *engaging students in learning*
- *Mirrors real-world*
  - *Authentic problems (messy, interdisciplinary...)*
  - *Mix of teamwork & self-directed learning*
  - *Inquiry and scientific methods*
  - *Information literacy*

**PRISM**

<http://www.prism.emory.edu>



**PRISM**

**Problems & Research to Integrate Science & Mathematics**  
Emory University & Clark Atlanta University, Atlanta, GA

## Why use PBL and ICBL in K-12?

- To apply abstract ideas to complex problems
- To initiate investigations
- To assess knowledge and skills
- To contextualize subject matter
- To develop global and multicultural perspectives
- To see value of interdisciplinarity
- To develop metacognitive skills
- To foster lifelong learning
- To build learning communities

<http://www.prism.emory.edu>

{What Makes A Good Case?}

DIALOGUE

A Good Story Line  
Interactive

ACTION

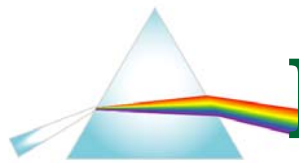
Real Life Relevance  
Controversy/Drama

Real (not made up) story  
Short + sweet

current-story no more than 5yrs old  
hook

~~Facilitator~~  
ME





# PRISM

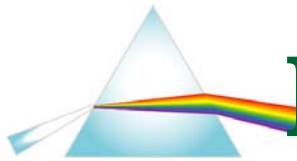
Problems & Research to Integrate Science & Mathematics  
Emory University & Clark Atlanta University, Atlanta, GA

## How Emory PRISM uses PBL

- PBL Immersion @ Summer Institute
  - Motivate teams to learn about PBL
  - Teach each other about PBL
  - Experience what it's like to be a student in PBL
  - Witness good/bad facilitation techniques
  - Discuss roles, expectations, and communication within PRISM teams
- Exposure to a variety of PBL tools/models
- Teams adopt/adapt existing PBL cases (U Del, Buffalo, Emory), and write originals
- Publish lessons on CASES Online, present at conferences/workshops

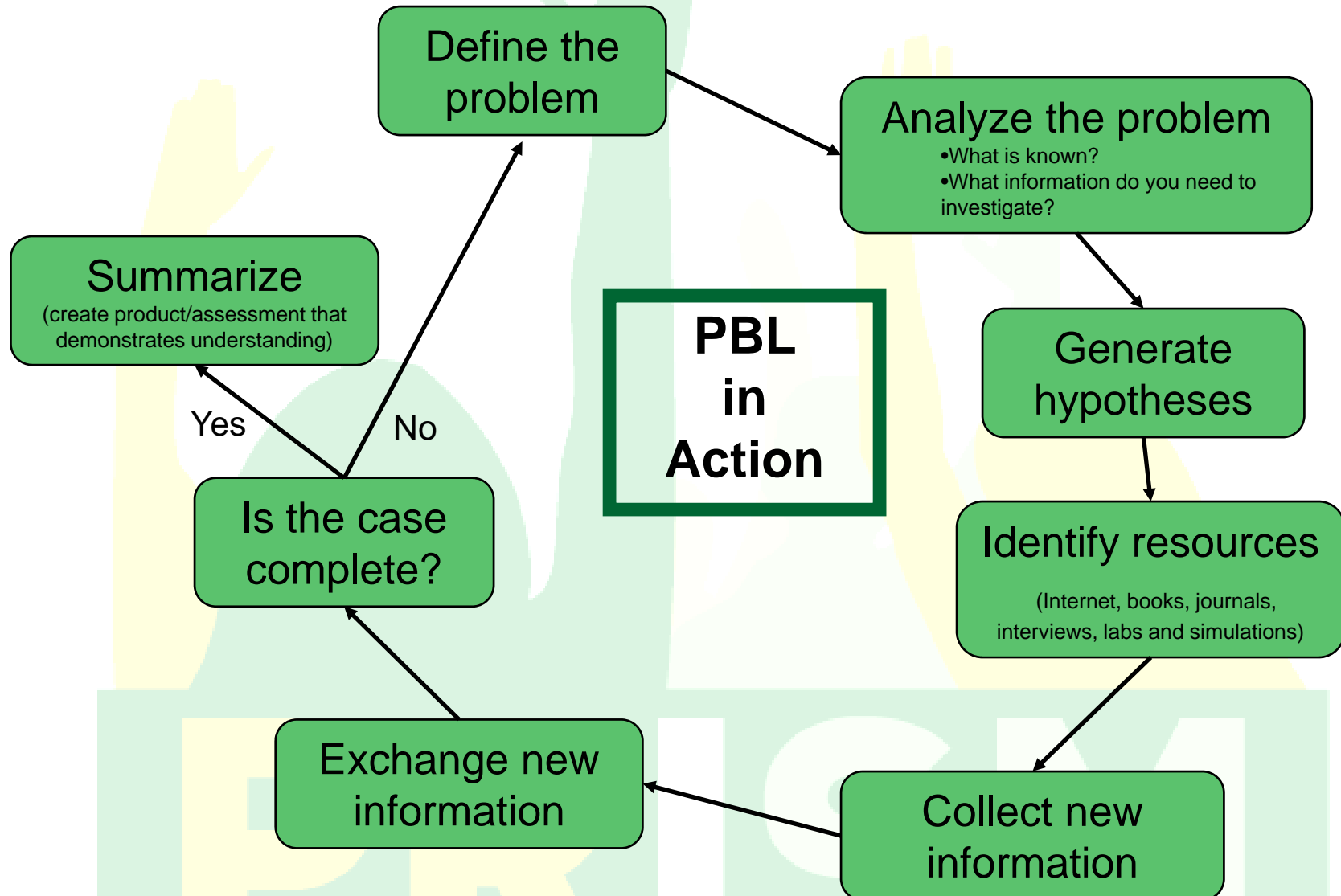
<http://www.prism.emory.edu>





# PRISM

Problems & Research to Integrate Science & Mathematics  
Emory University & Clark Atlanta University, Atlanta, GA





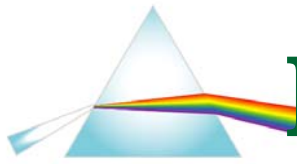
# PRISM

**Problems & Research to Integrate Science & Mathematics**  
Emory University & Clark Atlanta University, Atlanta, GA



PRISM

<http://www.prism.emory.edu>

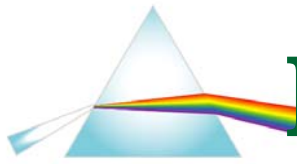


# PRISM

**Problems & Research to Integrate Science & Mathematics**  
Emory University & Clark Atlanta University, Atlanta, GA



<http://www.prism.emory.edu>



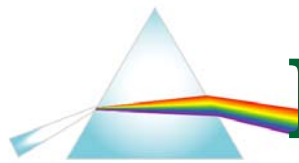
# PRISM

**Problems & Research to Integrate Science & Mathematics**  
Emory University & Clark Atlanta University, Atlanta, GA



# PRISM

<http://www.prism.emory.edu>



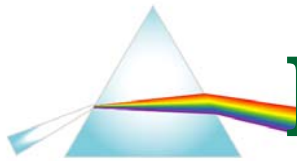
**PRISM**

**Problems & Research to Integrate Science & Mathematics**  
Emory University & Clark Atlanta University, Atlanta, GA

# Rethinking PBL for K-12: Flexible Implementation Models

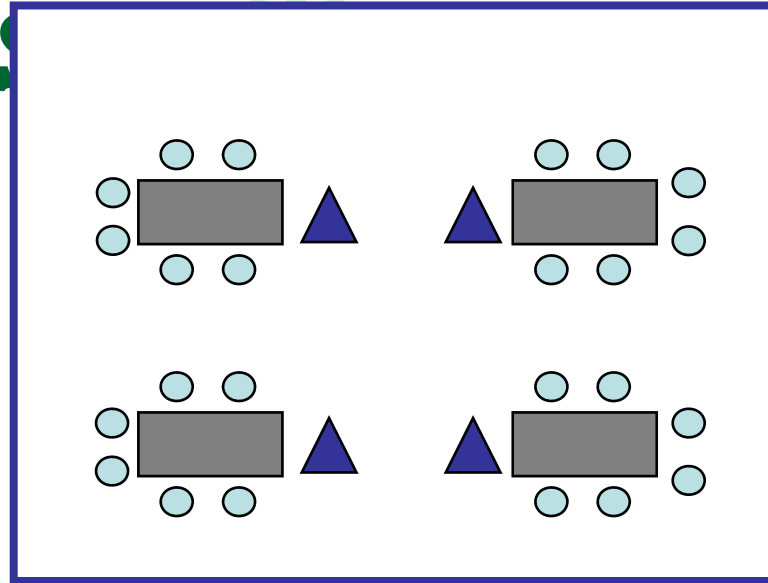
- Roving facilitator
- Peer facilitators
- Alternate whole class and small group
- Short, targeted problems for specific objectives
- Large class with IT support

<http://www.prism.emory.edu>



**PRIS**

**Integrate Science & Mathematics**  
Emory University, Atlanta, GA

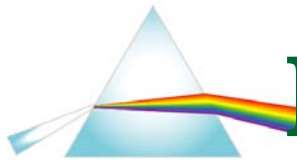


### **Small group / multiple facilitator**

*This is the traditional PBL approach, with a trained facilitator in each group. Since there is typically only one teacher per classroom, this model is not generally feasible for K-12 schools. However, university students/faculty/staff, school staff/administrators, parents, and even advanced K-12 students may be used as facilitators.*

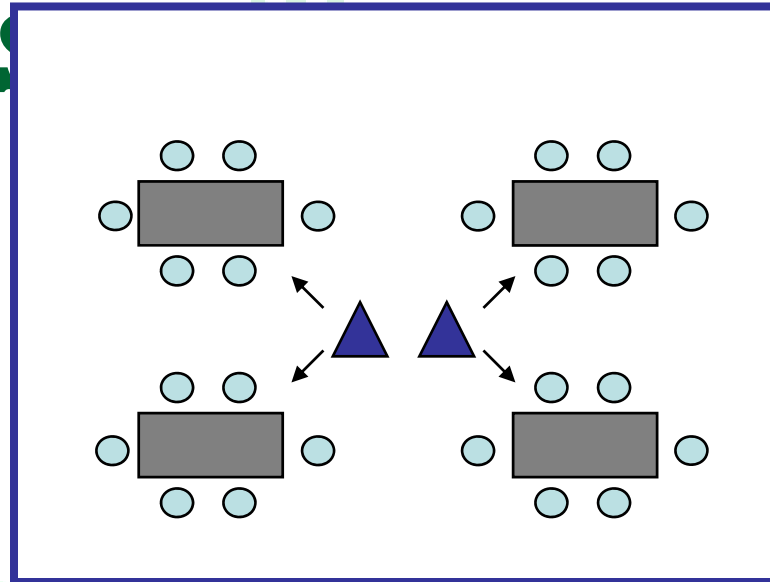
**PRO:** *Each group has a trained adult facilitator for maximal instructional support.*

**CON:** *Resource intensive (recruitment, training, scheduling multiple facilitators).*



**PRISM**

**Integrate Science & Mathematics**  
Emory University, Atlanta, GA

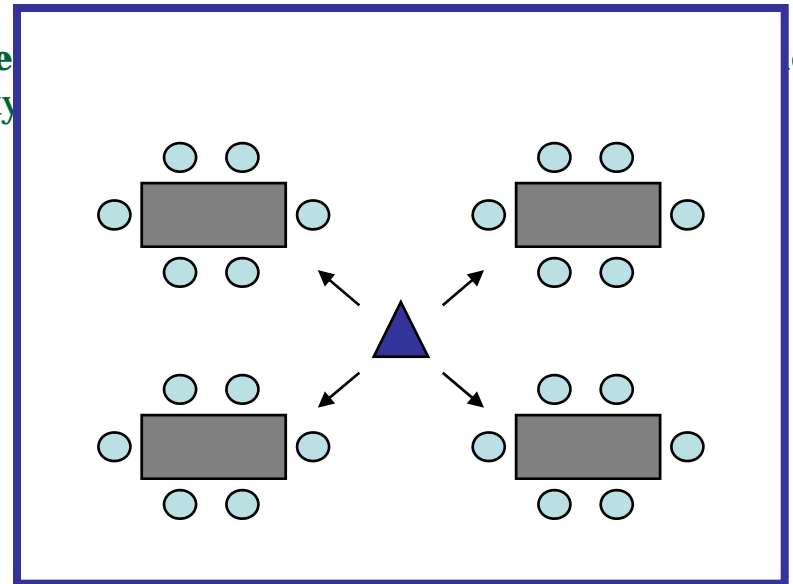
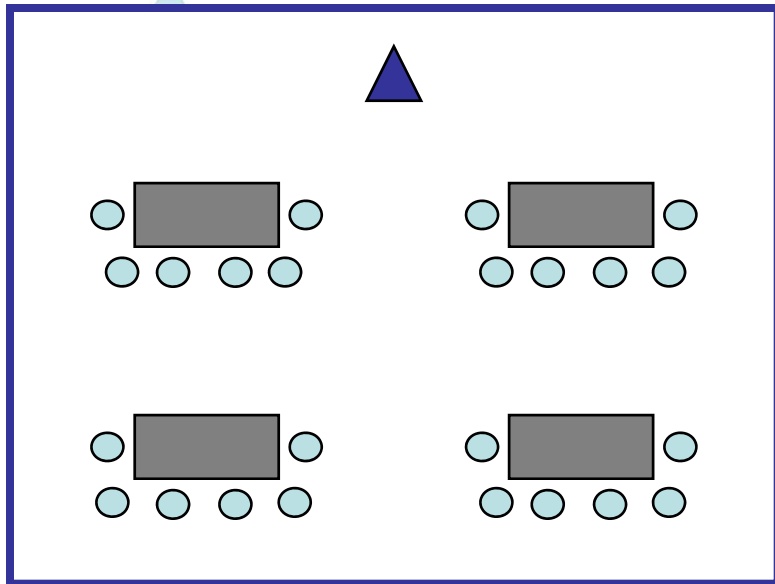


### **Small group / two roving facilitators**

*In some classroom settings, it may be possible for two teachers to serve as roving facilitators. The classroom teacher may enlist the assistance of a team teacher, inclusion teacher, ESOL teacher, or other school staff. Furthermore, local graduate or undergraduate students may be available as classroom facilitators.*

**PRO:** *A more reasonable model for K-12 settings than the traditional PBL model, while still permitting lower student-teacher ratio than normal.*

**CON:** *Depends on availability and training of the second facilitator.*



### Large group / teacher as facilitator

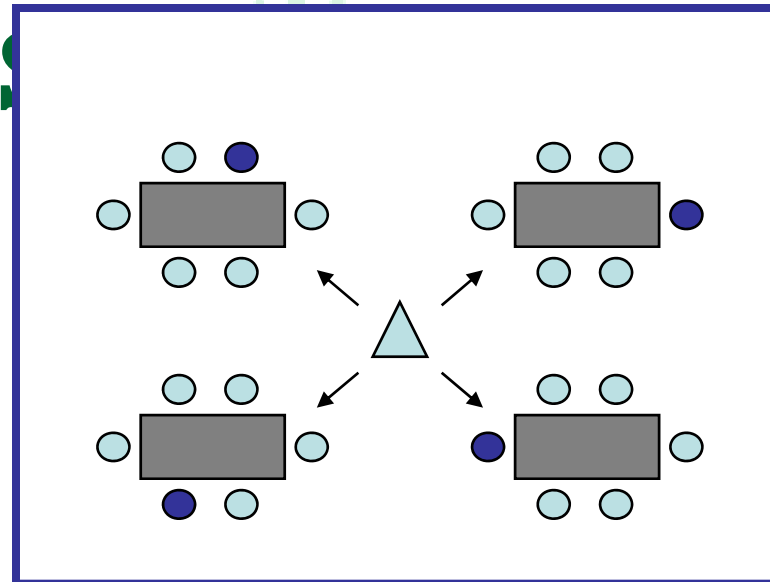
### Small group / teacher as roving facilitator

*Although the large group model (on left) looks like a non-PBL classroom, when used in conjunction with the small group model (on right), the result is a mixed-model approach that makes PBL feasible for a single teacher. Students are able to work in small groups as the teacher rotates around the room spending time with each group. The teacher is then able to debrief the entire group, facilitating a whole-class discussion with input from each small group.*

**PRO:** *Feasible model for a 1-teacher classroom.*

**CON:** *It can be easy to fall back into teacher-centered instruction.*





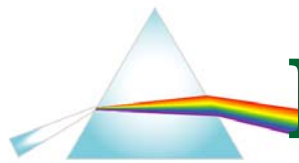
### **Small group / student groups self-facilitate / teacher as roving facilitator**

*This is the ideal model, in which students facilitate their own groups. This does not typically occur until later in the semester, after students have experienced PBL for some time and understand what is expected of them. Gradual movement toward this model can be made through step-wise increases in student responsibilities; as the teacher steps back, the students step up. The teacher still rotates through each group, but is less involved with managing group dynamics and directly facilitating group discussion. The students are now self-directed and self-sufficient learners.*

*PRO: Students take charge of their own learning.*

*CON: It takes time to develop the experience, leadership, maturity, and self-confidence necessary for students to facilitate themselves.*





**PRISM**

**Problems & Research to Integrate Science & Mathematics**  
Emory University & Clark Atlanta University, Atlanta, GA

# University of Delaware

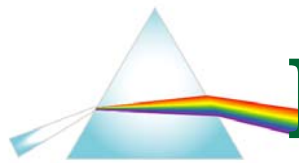
GK-12: Improvement of Science Education in Vocational  
Technical High Schools

Newark, DE

[www.udel.edu/GK-12](http://www.udel.edu/GK-12)

**PRISM**

<http://www.prism.emory.edu>



# PRISM

Problems & Research to Integrate Science & Mathematics  
Emory University & Clark Atlanta University, Atlanta, GA

*Hydrothermal Vents:*

*Discovery of a New Ecosystem*



## University of Delaware

Newark, DE

[www.udel.edu/GK-12](http://www.udel.edu/GK-12)

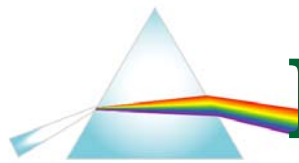
- Small Groups (2-3 students)
- Two roving facilitators
- Web-based research



Delaware  
K-12



<http://www.prism.emory.edu>



# PRISM

**Problems & Research to Integrate Science & Mathematics**  
Emory University & Clark Atlanta University, Atlanta, GA

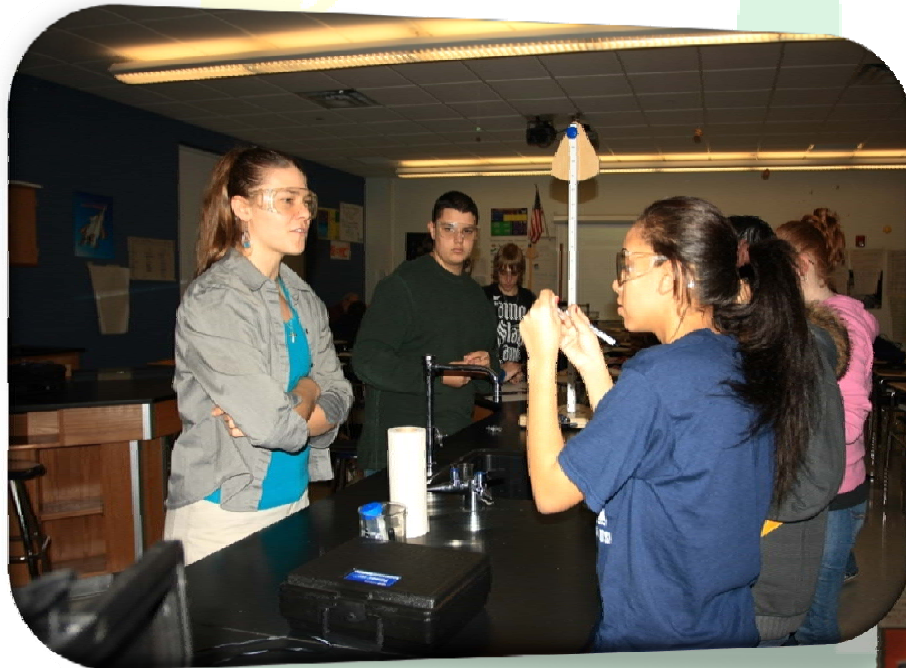
*Hydrothermal Vents:*

*Discovery of a New Ecosystem*

University of Delaware

Newark, DE

[www.udel.edu/GK-12](http://www.udel.edu/GK-12)



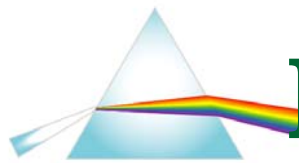
- Small Groups (2-3 students)
- Two roving facilitators
- Web-based research



Delaware  
K-12



<http://www.prism.emory.edu>



# PRISM

Problems & Research to Integrate Science & Mathematics  
Emory University & Clark Atlanta University, Atlanta, GA

## Small Group/Two Roving Facilitator Model

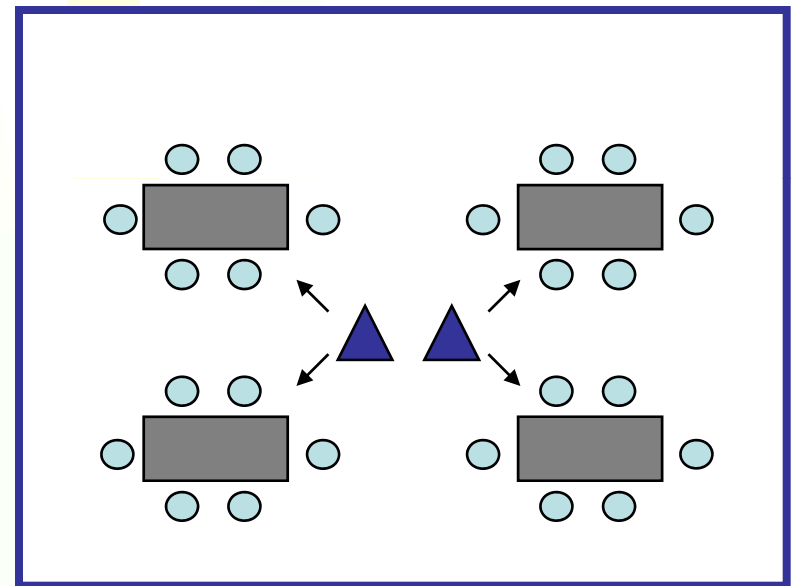
*PRO: Approach fits well with our GK-12 model having a teacher-fellow pair working together in the classroom.*

*CON: More direction needed for younger students.*

University of Delaware

Newark, DE

[www.udel.edu/GK-12](http://www.udel.edu/GK-12)



# PRISM

<http://www.prism.emory.edu>



# Hydrothermal Vents

Discovery of a new Ecosystem

Home Your Task Lab Grading UD GK12 NCCVoTech NSF

## Overview

click here!



Toxic CHEMistry

Online Expeditions

How VENTS work?

Lost CITY expedition



Unexplored before 1977, hydrothermal vents (aka: 'black smokers') represent a unique environment on our planet. In spite of their inaccessibility, they continue to be the focus of much investigation and research, the results of which are helping to answer many scientific questions. Imagine that you and your partner are the first scientists to ever see a hydrothermal vent. As you plunge deep into the abyss near the Mid-Ocean Ridge system you see them...

Chimneys reaching as high as a 15 story building with billowing smoke stacks shooting from their tops. Amazed, you lean over to your fellow scientist and ask "How can there be smoke underwater? This is CRAZY! What is the smoke?"

**Your Task:** Thinking like a Geochemist, describe the chemical makeup of the 'smoke' coming from these underwater chimneys. Use the links to the left (see [click here](#)) to work through **Parts 1-3** under **Your Task** (see above). This should help you answer the question... **What is the Smoke?**

# Hydrothermal Vents

## Discovery of a new Ecosystem

Home Your Task™ Lab Grading UD GK12 NCCVoTech™ NSF

### the basics

click here!

So, where to begin? Whenever faced with a problem, start with the basics. Hydrothermal Vents...What are they? Where do you find them? Have 10 min to work through this section...GO!

Geo:Earth  
(think minerals, rocks, soil, water, atmosphere)

Chemist  
someone who is interested in the properties and reactions of matter (atoms and molecules).

Delaware  
K-12

- Toxic CHEMistry
- Online Expeditions
- How VENTS work?
- Lost CITY expedition

# Hydrothermal Vents

## Discovery of a new Ecosystem

Home Your Task™ Lab Grading UD GK12 NCCVoTech™ NSF

### properties

click here!

Now lets get down to business! You remember way back when we learned about Physical properties...Well, now it's time to dust off that piece of knowledge and use it. To scientifically describe hydrothermal vent 'smoke'

we need to understand the physical properties near hydrothermal vents. What is it like inside the vent? How do the physical properties change as you move away from the vent?

What about chemical properties? What atoms, ions, or molecules make up the 'smoke'? What reactions are taking place?

Physical (properties) vs Chemical (properties)

- Toxic CHEMistry
- Online Expeditions
- How VENTS work?
- Lost CITY expedition

# Hydrothermal Vents

## Discovery of a new Ecosystem


Home Your Task™ Lab Grading UD GK12 NCCVoTech™ NSF

### energy

click here!

Well you made it! This is our last task for the day. Lets switch our focus a bit to how the 'smoke' is made. Think back to when we talked about energy transfer. ...Describe how energy is transferred in this system. To really understand how this underwater 'smoke' is made we

need to understand how energy transfer and hydrothermal vents are related. Give it a shot....Hint: Check out *How VENTS work?*.

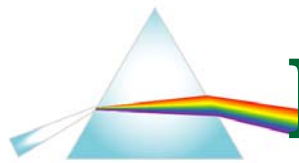


- Toxic CHEMistry
- Online Expeditions
- How VENTS work?
- Lost CITY expedition

many scientific questions. Imagine that you and your classmates are the first scientists to ever see a hydrothermal vent. As you explore the Mid-Ocean Ridge system you see them...

- Breaking issue into tasks...
- Focuses student research
- Full coverage of learning objectives
- Exemplifies of how to address a complex problem





# PRISM

**Problems & Research to Integrate Science & Mathematics**  
Emory University & Clark Atlanta University, Atlanta, GA

University of Delaware

Newark, DE

[www.udel.edu/GK-12](http://www.udel.edu/GK-12)

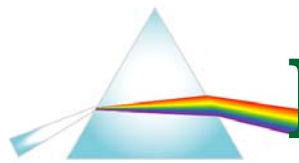
*Observations: 9<sup>th</sup> grade Physical Science*

- Contextualizing course material
  - Activities relate students' knowledge to the world around us.
- Effective assessment of student knowledge and misconceptions
  - Developing science vocabulary.
- Develop problem solving and research skills
  - Getting away from the short answer.

# PRISM

<http://www.prism.emory.edu>





# PRISM

**Problems & Research to Integrate Science & Mathematics**  
Emory University & Clark Atlanta University, Atlanta, GA

## PBL Clearinghouse

[www.udel.edu/pblc](http://www.udel.edu/pblc)

An Electronic Peer-Reviewed Publication

Institute for Transforming Undergraduate Education  
University of Delaware  
Newark, DE

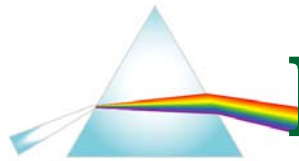


# PRISM

<http://www.prism.emory.edu>

Delaware  
K-12





# PRISM

**Problems & Research to Integrate Science & Mathematics**  
Emory University & Clark Atlanta University, Atlanta, GA

## *PBL Clearinghouse*

[www.udel.edu/pblc](http://www.udel.edu/pblc)

University of Delaware

Newark, DE

[www.udel.edu/GK-12](http://www.udel.edu/GK-12)

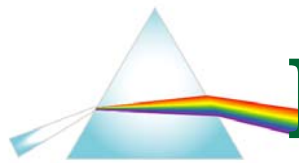
- An online database of PBL articles and problems.
- All material is peer-reviewed by PBL practitioners for content and pedagogy.
- All problems are supported by learning objectives and resources, teaching and assessment notes.
- Holdings are searchable by author, discipline, keywords, or full text.
- Fully electronic submission, review, and publication cycle.
- Controlled access by free user subscription, students excluded.



<http://www.prism.emory.edu>

Delaware  
K-12





# PRISM

**Problems & Research to Integrate Science & Mathematics**  
Emory University & Clark Atlanta University, Atlanta, GA

*PBL Clearinghouse*

[www.udel.edu/pblc](http://www.udel.edu/pblc)

University of Delaware

Newark, DE

[www.udel.edu/GK-12](http://www.udel.edu/GK-12)

## *New Features*

- Request e-mail notification of new additions (alert list)
- Submit and review user feedback to problems
- See statistics on published material



# PRISM

<http://www.prism.emory.edu>

Delaware  
K-12





**Problems & Research to Integrate Science & Mathematics**  
Emory University & Clark Atlanta University, Atlanta, GA

## *PBL Clearinghouse*

[www.udel.edu/pblc](http://www.udel.edu/pblc)

University of Delaware

Newark, DE

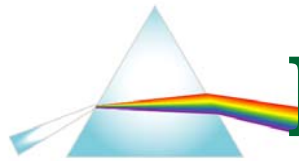
[www.udel.edu/GK-12](http://www.udel.edu/GK-12)

- Currently there are ~15,000 registered users and >120 PBL problems.
- Of the problems available, more than half are in physics, chemistry, and biology, but the number in other disciplines is growing steadily.
- We are very interested in publishing adaptations of problems to other cultural/geographical contexts.



<http://www.prism.emory.edu>





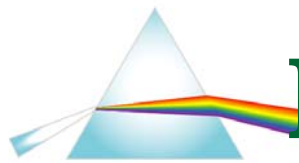
**PRISM**

**Problems & Research to Integrate Science & Mathematics**  
Emory University & Clark Atlanta University, Atlanta, GA

## Contact Info

- Emory/PRISM  
Pat Marsteller  
[pmars@learnlink.emory.edu](mailto:pmars@learnlink.emory.edu)
- University of Delaware  
George Watson  
[ghw@art-sci.udel.edu](mailto:ghw@art-sci.udel.edu)

<http://www.prism.emory.edu>



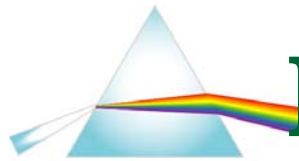
**PRISM**

**Problems & Research to Integrate Science & Mathematics**  
Emory University & Clark Atlanta University, Atlanta, GA

# PRISM Goals

- Build collaborative teams of K-12 teachers, graduate students, and undergraduates to develop and implement innovative precollege science lessons using PBL/ICBL.
- Provide opportunities for graduate and undergraduate students to practice communication, teamwork, and teaching skills.
- Provide opportunities for middle and high school teachers to develop new content knowledge and pedagogy.
- Provide young scientist role models for middle/high school students, increasing their interest in SMET careers and performance in SMET classes and tests.

<http://www.prism.emory.edu>



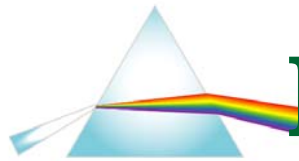
# PRISM

Problems & Research to Integrate Science & Mathematics  
Emory University & Clark Atlanta University, Atlanta, GA

- *PBL pedagogy and curriculum development*
  - 2-week Summer Institute,
  - develop ~8 original and adapted cases.
  - student-centered
  - facilitate small groups of students to ask appropriate questions, investigate and evaluate possible answers, and to demonstrate their learning to others.
  - 4 Planning Days throughout the year

<http://www.prism.emory.edu>





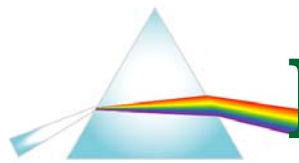
# PRISM

Problems & Research to Integrate Science & Mathematics  
Emory University & Clark Atlanta University, Atlanta, GA

- *Reflective teaching practices*
  - Monthly Progress Reports
  - Graduate Fellow Reflection Mtgs 2x per month, inc. peer-led journal club and post-graduate career development
- *Mentoring experiences with K-12 students*
  - Graduate Fellows spend 12 hrs/wk in classroom

# PRISM

<http://www.prism.emory.edu>



**PRISM**

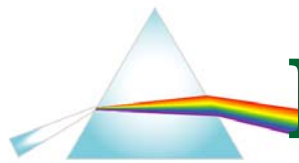
**Problems & Research to Integrate Science & Mathematics**  
Emory University & Clark Atlanta University, Atlanta, GA

# Professional Development

for graduate students

- Reflective practice
- Publishing your work
- Teaching philosophy statements
- Career options
- Jobs: searching, applying, interviewing, negotiating
- Science Education Journal club

<http://www.prism.emory.edu>



# PRISM

**Problems & Research to Integrate Science & Mathematics**  
Emory University & Clark Atlanta University, Atlanta, GA

- *Dissemination of educational scholarship*
  - lessons published on CASES Online ([www.cse.emory.edu/cases](http://www.cse.emory.edu/cases))
  - presentations at scientific and educational conferences
  - Lead workshops for local and international colleagues
  - Publication in peer-reviewed journals
  - undergraduate curriculum development after PRISM

<http://www.prism.emory.edu>



**Problems & Research to Integrate Science & Mathematics**  
Emory University & Clark Atlanta University, Atlanta, GA

# Dissemination

- **CASES Online:**  
Creating Active Student Engagement in the Sciences
- Searchable database
- Downloadable materials
  - teacher guide
  - student materials
  - sample student products
- ~70 complete cases
- ~80 more on their way
- Free registration!
- <http://www.cse.emory.edu/cases>

## CASES Online

Creating Active Student Engagement in the Sciences

[Log Out](#)

[User Guide](#)

[Search Cases](#)

Welcome, Jordan Rosel

### Recently Viewed Cases

- The day after tomorrow
- Out of breath
- Crisis in the ATL!
- To live and diet
- Break down

### Manage Your Account

#### Submit a Case

#### Admin

- Manage Cases
- Add a Subject
- Manage Users

### Case Details

#### Case Title:

Crisis in the ATL!

#### Author(s):

Bethany Turner  
Katherine Shamsid-Deen

#### Date Published:

2/22/2006

#### Grade Level(s):

Middle School

#### Subject(s):

Physical Science

#### Summary:

It's a steamy summer day in Atlanta when suddenly the power blinks out over the entire city! To make matters worse, all of the electricians in the area are out of town at a conference. Mayor Shirley Franklin is offering a \$20,000 reward to anyone who can put together a proposal that details what probably went wrong and how to fix it. Since you are in a suburb that still has power, help your Atlanta friends put together a presentation for the mayor so the problem can be fixed and you can win the reward.

#### Suggested Citation:

Turner, B. L., & Shamsid-Deen, K. K. (2006). *Crisis in the ATL!*. Retrieved March 21, 2006 from Emory University, CASES Online Web site:  
[http://www.cse.emory.edu/cases/casedisplay.cfm?case\\_id=167](http://www.cse.emory.edu/cases/casedisplay.cfm?case_id=167)

#### Learning Objectives:

1. Define "power-out" and explain what can cause one.
2. Describe the properties of electricity, including types of currents & how electricity travels.
3. Explain how electricity is produced and distributed, and types of resources that are commonly used.
4. Diagram the way that electricity works, from a simple household circuit to a power plant.
5. Identify what could have caused a power-out that is at the city-wide level, especially during the summer, and show how it could have happened.
6. Define key terms including direct vs. alternating currents, fuses, circuits, wattage, voltage, transformer and power plant.

#### National/State Standards:

*Georgia Performance Standards Addressed:*

SCSh3. Students will identify and investigate problems scientifically. (NSES Content Standard A).  
SBP5. Students will recognize characteristics of gravity, electricity, and magnetism as major kinds of forces acting in nature. (NSES Content Standard B)  
b. Demonstrate the advantages and disadvantages of series and parallel circuits and how they transfer energy.

#### Download Case Materials:

- Download [Teacher Guide](#)
- Download [Student Materials](#)

[\[search for all cases like this one\]](#)

[About CASES](#)

[Contact Us](#)

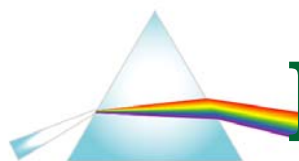
[Terms of Use](#)

[Center for Science Education](#)

[Emory University](#)

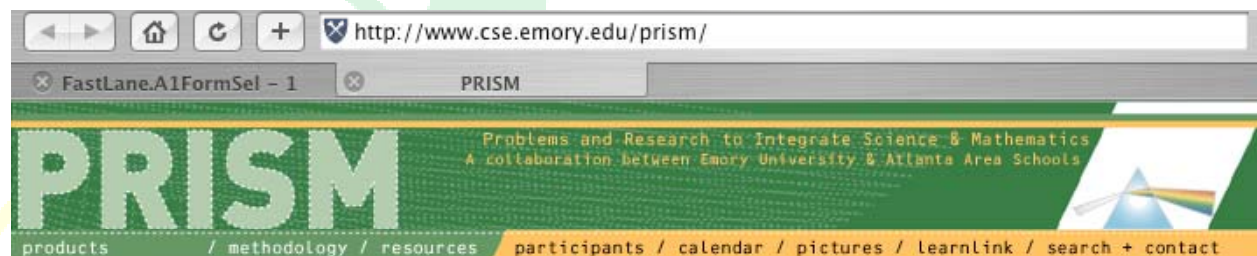


<http://www.prism.emory.edu>



# PRISM

Problems & Research to Integrate Science & Mathematics  
Emory University & Clark Atlanta University, Atlanta, GA



You are: Home

## Upcoming Events

5/12:  
Grad Student  
Reflection Session

5/26:  
Grad Student  
Reflection Session

[more...](#)

## News

Check out these 2 new publications by PRISM participants!

Turner, B. L., Shamsid-Deen, K. K. (2005). *Good, messy, frothing fun*. *Science Scope*, 28(7), 10-13.

Closser, S., McManus, M. (in press) *Outbreak: An activity to foster awareness of everyday public health issues*. *American Journal of Health Education*.

PRISM, the Problems and Research to Integrate Science and Mathematics program, offers annual fellowships to Emory University graduate students, undergraduates, and middle/high school teachers to develop and implement innovative K-12 lessons using problem-based learning (PBL) and investigative case-based learning (ICBL) pedagogies. The Fellows form collaborative teams to infuse precollege students with a **compelling need to know** about the science and math behind real-world problems. Our Fellows facilitate small groups of students as they use a combination of teamwork and self-directed learning to investigate the problems and cases we have developed. We hope students will develop life-long problem-solving strategies based on asking appropriate questions, uncovering answers through investigation, and sharing knowledge with peers.

PRISM intends to influence the next generation of scientists by providing them with opportunities to practice teaching, communication, and research dissemination skills, and by fostering scientific literacy in public school students. Through this effort we will make changes across the continuum of K-12, undergraduate, and graduate education.

### Products

Discover the amazing cases, presentations, publications, and reports that PRISM participants have developed.

### Methods

Find out how PRISM recruits and develops its participants, develops and implements its lessons, and evaluates the program.

### Resources

Explore our recommended links to case repositories, guidance on case development and implementation, national and state standards, education reform, evaluating Web resources, and more.

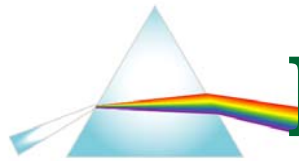
### Participants

Meet our Fellows! Read their bios! Aren't they wonderful? You can be that wonderful, too. [Apply here.](#)

### Calendar

What we do and when we do it.

<http://www.prism.emory.edu>



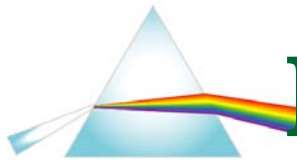
# PRISM

Problems & Research to Integrate Science & Mathematics  
Emory University & Clark Atlanta University, Atlanta, GA

## Dissemination

- Publications:
  - Closser, S., & McManus, M. (2005). Outbreak: An activity to foster awareness of everyday public health issues. *American Journal of Health Education*, 36(5), 316-319.
  - Turner, B. L., & Shamsid-Deen, K. K. (2005). Good, messy, frothing fun. *Science Scope*, 28(7), 10-13.
- Presentations:
  - PIs/staff/grads/tchrs gave ~40 presentations at AAAS, GA Science Teacher Assoc., Am. Soc. for Microbiol., Experimental Bio., PBL conferences
- Workshops:
  - At school/district teacher professional development days (led by our teachers and grads) and PBL International 2006 and 2008
  - For Nursing School, College, Medical School faculty

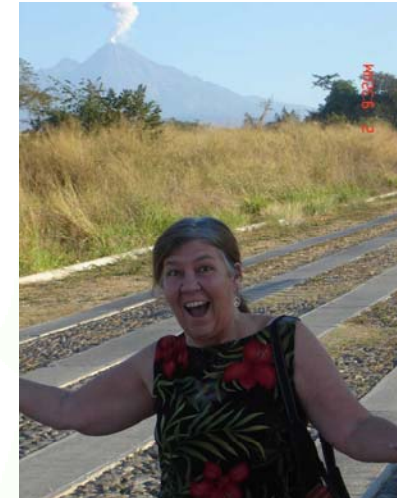
<http://www.prism.emory.edu>

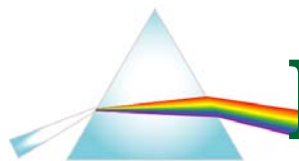


# PRISM

Problems & Research to Integrate Science & Mathematics  
Emory University & Clark Atlanta University, Atlanta, GA

## PBL 2008 International Conference





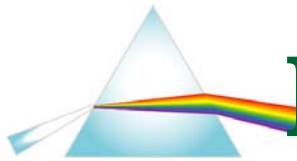
# PRISM

**Problems & Research to Integrate Science & Mathematics**  
Emory University & Clark Atlanta University, Atlanta, GA



<http://www.prism.emory.edu>



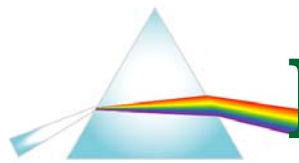


# PRISM

**Problems & Research to Integrate Science & Mathematics**  
Emory University & Clark Atlanta University, Atlanta, GA



<http://www.prism.emory.edu>



# PRISM

**Problems & Research to Integrate Science & Mathematics**  
Emory University & Clark Atlanta University, Atlanta, GA

- *Opportunities for leadership*
  - “Lead Fellowships” to disseminate problem-based learning pedagogy and promote sustainable change in K-16 science education
  - examples:
    - designing and leading professional development workshops for other graduate students, teachers, or faculty;
    - working with faculty to design more engaging curriculum materials for undergraduate courses
    - writing book chapters or other publications
    - assisting with PRISM program evaluation
    - developing resource materials for use in PRISM or by other educators
    - [insert your idea here]

# PRISM

<http://www.prism.emory.edu>