

# Orientation to the PBL Clearinghouse: An Electronic Peer-Reviewed Publication



*Institute for Transforming  
Undergraduate Education*

*University of Delaware*



PBL2002: A Pathway to Better Learning

June 16-20, 2002



# Characteristics of Good PBL Problems

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**Relate to real-world, motivate students**

**Require decision-making or judgements**

**Multi-page, multi-stage**

**Designed for group-solving**

**Initial questions open-ended, encourages discussion**

**Incorporates course content objectives**

**Challenges to higher-order thinking**



# **But...where are the problems?**

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**Typical end-of-chapter problems can be solved by rote memorization, pattern-match, and plug-and-chug techniques**

**Good problems should require students to make assumptions and estimates, develop models, and work through the model.**

**A source of problems outside the commercial texts needs to be developed.**



# PBL Clearinghouse

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- 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.**



# A Brief Tour of the Clearinghouse

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**Logging in to the Clearinghouse**

**Applying to be a user**

**Searching and Browsing the holdings**

**Examining problem detail and supporting materials for a sample problem**

**Managing Clearinghouse activities**

**Submitting a problem for review**

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

## Problem-Based Learning Clearinghouse

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### About the Clearinghouse

Welcome to the PBL Clearinghouse, a collection of problems and articles to assist educators in using problem-based learning. The problems and articles are peer reviewed by PBL experts in the disciplinary content areas. Teaching notes and supplemental materials accompany each problem, providing insights and strategies that are innovative and classroom-tested. Access to the Clearinghouse collection is limited to educators who register via an online application, but is free and carries no obligation.

### What's in the Clearinghouse?

[View sample problems and articles.](#)

### Logon to the Clearinghouse

Enter your Clearinghouse Email-ID and password.

**Email-ID:****Password:**[Logon](#)

### Apply for Access

[Apply to use the Clearinghouse.](#)  
[Apply to become a Clearinghouse author or reviewer.](#)

### For More Information

[About Us](#)  
[Read the Clearinghouse FAQ.](#)  
[Question and comment form](#)  
Institute for Transforming Undergraduate Education  
Problem-Based Learning at the University of Delaware

# Apply to use the Clearinghouse

## Step 1: Provide biographical information

Symbol Key: \* Required Information, ! Error

Salutation:

First Name: \*

Middle Name or Initial:

Last Name: \*

Suffix:

Institution: \*

Title or Position: \*

Primary Discipline: \*

Other:

Secondary Discipline:

Other:

Personal Home Page:

\* Briefly state your interest in problem-based learning.

### Step 2: Create an account

The Clearinghouse uses your e-mail address as your login ID and for communication with you. Please specify your full working e-mail address and a password to the Clearinghouse below.

E-mail: \*

Password: \*  (4-32 characters)

Type password again: \*

If you forget your password we will ask the question below. If you answer correctly, we will send your account information to your email address.

Password Hint: \*

Answer: \*

### Step 3: Review the Clearinghouse user agreement

[Clearinghouse User Agreement](#)

**I agree to the above terms - Submit Form**

**Exit without Saving**

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## Featured Problem



### [Teetering On the Brink of Extinction?](#)

Driving slowly down a gravel road in southern Florida in the failing late-afternoon light, I was startled by the long tawny form, which loped across the road in front of the car. My glimpse was only a second or perhaps two at most and then it was gone...

[\(see complete text\)](#)

## Search the Clearinghouse

for  by

Enter search string:

GO

## Browse the Clearinghouse

Choose one... Choose one...

- by Keyword  
 by Discipline  
 by Author
- A B C D E F G H I J K L M  
N O P Q R S T U V W X Y Z

## Et cetera

- [What's new in the Clearinghouse?](#)
- [Manage my Clearinghouse activities.](#)
- [View my favorites.](#)
- [Apply to become a Clearinghouse author or reviewer.](#)
- [Read the Clearinghouse FAQ.](#)
- [Submit the question and comment form.](#)

**PBL Browse by Discipline - Netscape**

File Edit View Go Communicator Help

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### Browse by Discipline

Discipline	Type	Title	Author
Physics and Astronomy	problem	<a href="#">A Bad Day for Sandy Dayton</a>	Barbara Duch
	problem	<a href="#">Tracy Lynn's "Yellow Banana"</a>	Barbara Duch
	problem	<a href="#">A Day in the Life of John Henry, Traffic Cop</a>	Barbara Duch
	problem	<a href="#">Crossed Circuits</a>	George Watson
Political Science	problem	<a href="#">Responding to Economic Crisis in Africa</a>	Gretchen Bauer
	problem	<a href="#">Alleviating the AIDS Crisis in South Africa</a>	Gretchen Bauer
Problem-Based Learning	article	<a href="#">Emphasizing the "Problem" in PBL</a>	Barbara Duch

[A](#) [B](#) [C](#) [D](#) [E](#) [F](#) [G](#) [H](#) [I](#) [J](#) [K](#) [L](#) [M](#) [N](#) [O](#) [P](#) [Q](#) [R](#) [S](#) [T](#) [U](#) [V](#) [W](#) [X](#) [Y](#) [Z](#)

[PBL Clearinghouse home](#) | [Manage Activities](#) | [Exit PBL Clearinghouse](#)

https://www.mis4.udel.edu/Pbl/viewIndex.jsp?id=22243959088

## Problem Detail

**Title:** Crossed Circuits

**Author:** George H Watson  
Department of Physics and Astronomy  
University of Delaware  
Newark, DE 19716  
[ghw@physics.udel.edu](mailto:ghw@physics.udel.edu)

**Discipline:** Physics and Astronomy

**Target Audience:** Introductory, non-majors

**Keywords:** circuits, electric energy, electric power, electricity

**Length of Time/Staging:** one class/all at once

**Abstract:** Two roommates argue about each others use of energy. Which roommate should pay a utility premium? How much extra?

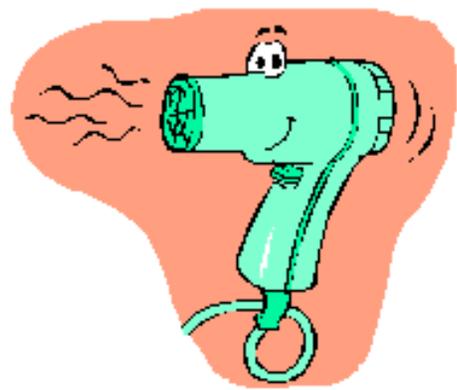
**Date Submitted:** 10/2/2000

**Date Published:** 1/5/2001

**Problem content:** [Problem Statement](#)

**Supporting Materials:** [Format of Delivery](#)   
[Student Learning Objectives](#)  
[Student Resources](#)  
[Instructor Resources](#)  
[Author's Teaching Notes](#)  
[Assessment Strategies](#)  
[Solution Notes](#)

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## Crossed Circuits

"How long does it take you to dry your hair?" came Chris's scream from the kitchen. "I'm trying to concentrate on my physics homework!"

"Do you want the answer as a fraction of a year?" came Pat's retort from the bathroom. "Then you can have fun looking up the conversion to minutes in the back of your textbook!"

"You've been at it for at least 20 minutes. You know, you should have to pay extra toward the electric bill. I bet you spend an hour a day drying your hair. I think \$5 extra each month would be about right."

"You've gotta be kidding me. With you and your night light burning all night long, I bet you use much more electricity than me! What are you afraid of anyway?"

"Yeah, but sometimes you fall asleep with your TV blaring. I bet that uses much more than my little night light."

"Oh, please! That only happens once a month. Your Winnie-the-Pooh light is on every night! Besides, how about your incessant showering. You take at least twice as long in the shower as I do. That must cost much more than running my hair dryer. What do you do in there anyway?"

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### Student Learning Objectives

**Title:** Crossed Circuits

Students learn that:

1. Appliances consume electrical power and that we pay for electrical energy.
2. Energy is the product of power consumed and the time over which it is consumed.
3. Electrical energy is commonly measured in kW-hr (kilowatt-hour) and energy charges are typically \$0.05 to \$0.08 per kW-hr.
4. Electrical heating typically consumes more power than lighting and other small appliances in the home.

[Problem Detail](#) | [PBL Clearinghouse home](#) | [Exit PBL Clearinghouse](#)



Document: Done



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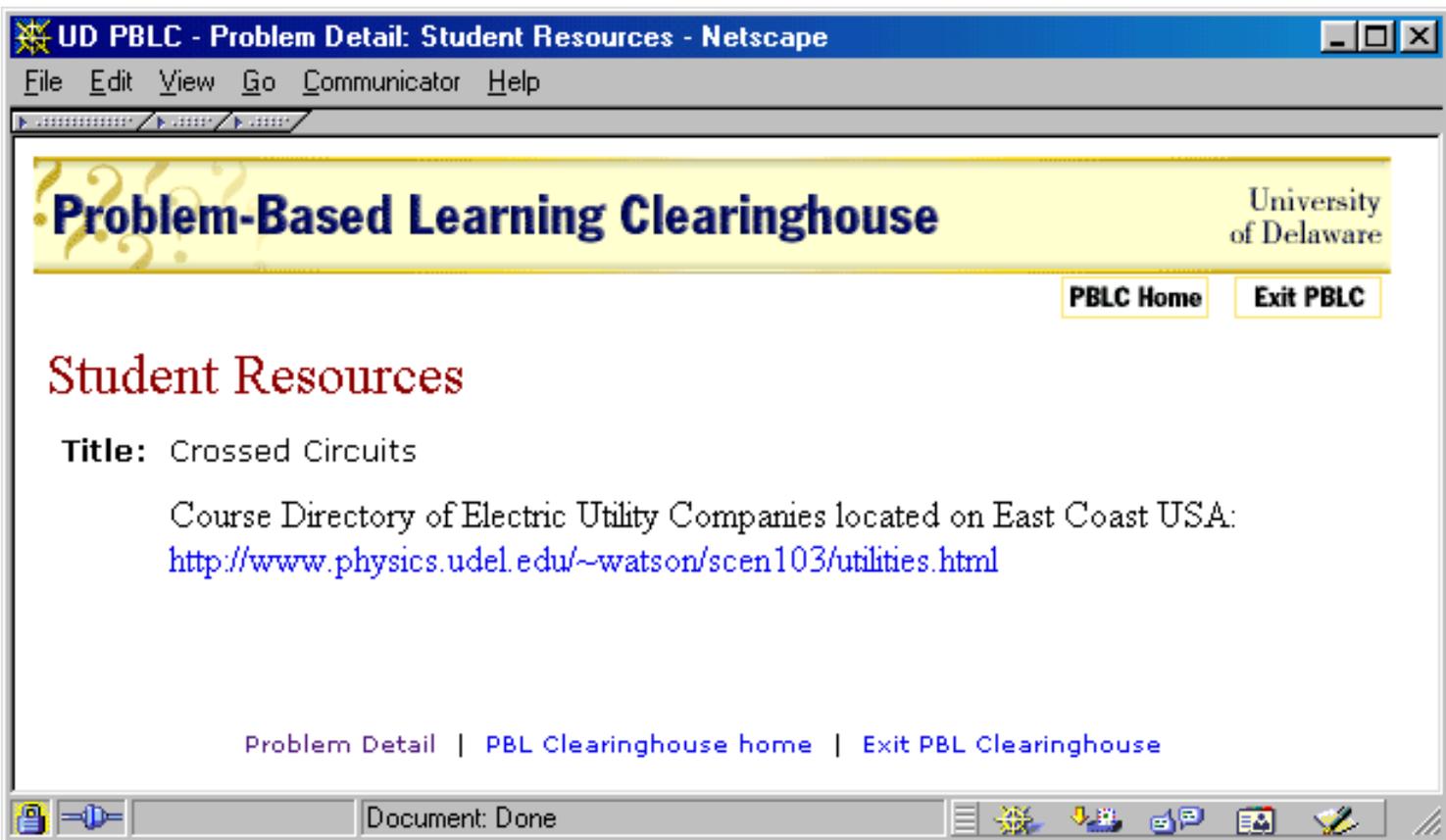
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[Student Resources](#)  
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[Author's Teaching Notes](#)  
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UD PBLC - Problem Detail: Author's Teaching Notes - Netscape

File Edit View Go Communicator Help

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## Author's Teaching Notes

**Title:** Crossed Circuits

This problem may serve as the introduction to PBL in an introduction to electricity for non-science majors. That is, it may serve as the first problem in a sequence leading them through a consideration of electrical circuits concepts. However, no circuit concepts are needed to solve this problem. Mainly students will be learning energy usage of various appliances and how utility companies charge for energy use.

Consideration of energy used in heating water for the shower tends to yield many interesting approaches from the students.

[Problem Detail](#) | [PBL Clearinghouse home](#) | [Exit PBL Clearinghouse](#)

Document: Done

## Problem Detail

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University of Delaware  
Newark, DE 19716  
[ghw@physics.udel.edu](mailto:ghw@physics.udel.edu)

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### Solution Notes

**Title:** Crossed Circuits

The night light and TV are of no consequence in the argument. The students' focus should be hairdryer *vs.* shower.

The hairdryer calculation is unambiguous: assume a power for the hairdryer: say 1200W. 20 minutes is 1/3 hr, so the energy used each time by the hairdryer is the product of 1200 W and 1/3 hr; that is, 0.4 kW-hr. 30 days would yield 12 kW-hr per month. Assuming \$0.07 per kW-hr would net a charge of about \$1 per month (\$0.84).

The hot water charge is less definitive and the students must rise to the challenge of finding an approach. A number will incorrectly look at the power rating for a typical electric hot water heater and multiply by the time of the shower -- hopefully the group will realize that the "hot" shower ends when the hot water held in the storage tank of the hot water heater is emptied *and* that it takes longer to heat the new water than it did to empty the tank during the shower. One suitable approach is to find out the storage capacity of a typical hot water heater and use lessons learned in freshmen chemistry to calculate the energy needed to raise that quantity of water from the temperature of tap water to the temperature suitable for showering.

## Featured Problem



### A Day in the Life of John Henry, Traffic Cop

Last Friday at 13:20, a frantic call was received at the local police station. A serious automobile accident had occurred at the intersection of Main St. and State St., with injuries involved. Lt. John Henry arrived at the scene 10 minutes after the phone call and found that two cars had collided at the intersection.

(see complete text)

## Search the Clearinghouse

for  by

Enter search string:

GO

## Browse the Clearinghouse

Choose one... Choose one...

- by **Keyword**  
 by **Discipline**  
 by **Author**

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N O P Q R S T U V W X Y Z

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## Manage my Clearinghouse activities

**for Authors:** [View the status of submissions requiring my attention](#)  
[Prepare a problem for submission](#)  
[Submit an article for review](#)  
[Revisit my problems and articles in progress \(not yet completed\)](#)  
[View my articles and problems published in the Clearinghouse](#)

**for Editor-in-Chief:** [View status of submissions requiring my attention](#)  
[Update featured problems](#)  
[Review prospective author/reviewer applications](#)

**for Editors:** [View status of submissions requiring my attention](#)  
[View prospective author/reviewer applications](#)

**for Reviewers:** [View status of submissions requiring my attention](#)

**for Administrators:** [Prepare accepted items for publishing](#)  
[Review prospective user applications](#)  
[Change user privileges](#)  
[Update discipline listing](#)  
[Revise reminder schedule](#)

**for all users:** [Update my biographical information](#)  
[View my privileges](#)

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## Manage my Clearinghouse activities

- for Authors:** [Prepare a problem for submission](#)  
[Submit an article for review](#)   
[View my articles and problems published in the Clearinghouse](#)
- for all users:** [Update my biographical information](#)  
[View my privileges](#)

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Document: Done



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## Submit a problem for review

### Step 1: Select co-authors

**Communicating Author:** George Watson

**Co-author(s):** Hold down the Ctrl key while clicking to select multiple names.

- None
- Deborah Allen
- Gretchen Bauer
- Brian Bowe
- Julio Carrion
- Barbara Duch**
- Lesa Griffiths
- Susan Groh
- Valerie Hans
- Sherry Kitto
- Barbara Knous
- Elizabeth Lieux
- Tracy Mullins
- Edmund Nowak
- Harold White

[Save and Exit](#)[Next Step](#)

# Submit an problem for submission

## Step 2: Enter the problem details

Symbol Key: \* Required Information, ! Error

**Problem Title:** \*

**Discipline:** \*   
Other:

**Target Audience:** \*  Introductory,  Intermediate,  Advanced  
and  
 Majors only,  Non-majors,  Other, specify below

**Keywords:** \* [\(see samples\)](#) Enter one descriptive keyword or term per box. These will be used as searchable terms from the Clearinghouse home page.

<input type="text" value="physics"/>	<input type="text" value="teaching"/>
<input type="text" value="conference"/>	<input type="text" value="problem-based learni"/>
<input type="text"/>	<input type="text"/>

**Length of Time/Staging:** [\(see samples\)](#)

**Abstract:** \*

# Problem-Based Learning Clearinghouse

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## Prepare a problem for submission

### Step 3: Enter article content

*Symbol Key:* \* Required Information, ! Error

**Problem Title:** 122nd AAPT National Meeting

**Problem Content:** \* Use this box to submit the problem in text-only format. If you prefer to submit the problem in a format other than ascii text, or if you need to include supporting files, you may attach binary files in the spaces provided below.

**Attach files:** If needed, attach binary files to support the problem. The files must have an extension like .pdf, .doc, .wpd, .ram, .xls, etc.

[Browse...](#)[Browse...](#)[Browse...](#)[Previous Step](#)[Save and Exit](#)[Next Step](#)

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## Prepare a problem for submission

### Step 4: Enter the supporting material

**Problem Title:** 122nd AAPT National Meeting

**Format of Delivery:**

**Student Learning Objectives:**

**Student Resources:**

**Instructor Resources:**

**Teaching Notes:**

## Submit a problem for review

### Step 5: Confirm before submitting

Verify that the problem is accurate. You will not have the capability to edit the problem once it is submitted. The information is presented below exactly as the reviewer will see it.

**Title:** 122nd AAPT National Meeting

**Author:** George H Watson  
Department of Physics and Astronomy  
University of Delaware  
Newark, DE 19716  
[ghw@physics.udel.edu](mailto:ghw@physics.udel.edu)

**Discipline:** Physics and Astronomy

**Target Audience:** Advanced, majors

**Keywords:** conference, physics, problem-based learning, teaching

**Length of Time/Staging:** 15 minutes

**Abstract:** I am creating screen shots for a PowerPoint presentation so I am submitting a problem to work my way through the process.

**Problem content:** [Go to problem content](#)

**Supporting Materials:** [Student Learning Objectives](#)  
[Student Resources](#)  
[Author's Teaching Notes](#)



## **Phase II: New Features**

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**Request e-mail notification of new additions (alert list)**

**Submit and review user feedback to problems**

**See statistics on published material**

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