ComPADRE Content Contextualization

http://www.compadre.org

Bruce Mason & Caroline Hall

Levels of Context

- Collections
- Course and Topics
- Modules for Teaching
- Connections, Relations, Textbooks, etc.

ComPADRE Community Collections

Editor run Collections for specific audiences

The Physics Source for Introductory Physics Courses

Introductory University Physics

astronomycenter

Introductory Astronomy

THE NUCLEUS

Physics Students

ThePhysicsFront

K-12 Teachers

Thermal Physics

the Quantum exchange

Quantum Physics

AAPT Physics Education Advanced Labs

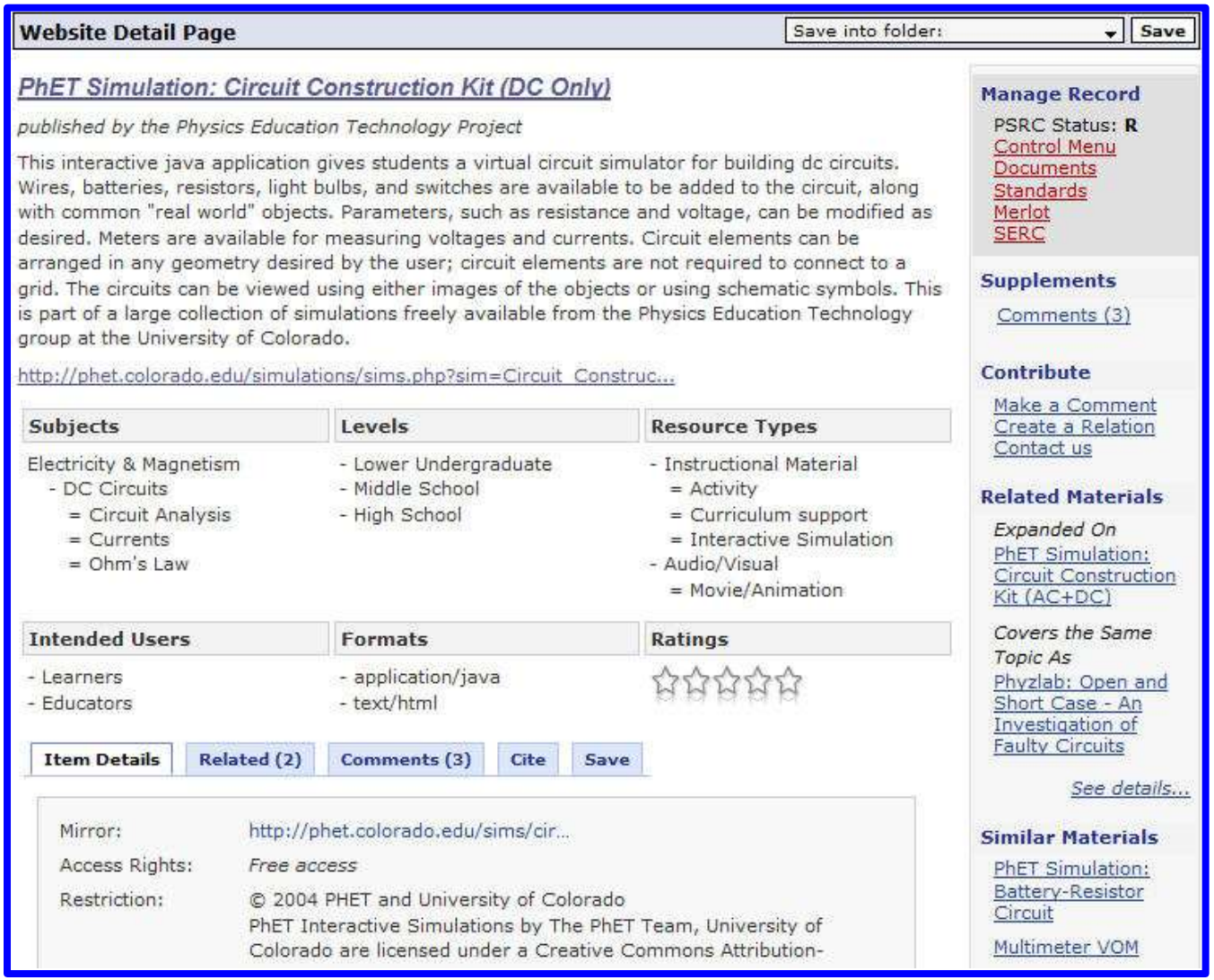
Advanced Labs

comPADRE Resources for Physics & Astronomy Education

NSDL 2010

Catalog Records

- Title
- Author
- URL
- Physics
  - Description
- Topics
- Usage
- Audience
- Format
- Cost
- Editor-Created
- Link Checked



Website Detail Page Save into folder: Save

PhET Simulation: Circuit Construction Kit (DC Only)

published by the Physics Education Technology Project

This interactive java application gives students a virtual circuit simulator for building dc circuits. Wires, batteries, resistors, light bulbs, and switches are available to be added to the circuit, along with common "real world" objects. Parameters, such as resistance and voltage, can be modified as desired. Meters are available for measuring voltages and currents. Circuit elements can be arranged in any geometry desired by the user; circuit elements are not required to connect to a grid. The circuits can be viewed using either images of the objects or using schematic symbols. This is part of a large collection of simulations freely available from the Physics Education Technology group at the University of Colorado.

http://phet.colorado.edu/simulations/sims.php?sim=Circuit_Construc...

Subjects	Levels	Resource Types
Electricity & Magnetism - DC Circuits = Circuit Analysis = Currents = Ohm's Law	- Lower Undergraduate - Middle School - High School	- Instructional Material = Activity = Curriculum support = Interactive Simulation - Audio/Visual = Movie/Animation

Intended Users	Formats	Ratings
- Learners - Educators	- application/java - text/html	☆☆☆☆☆

Item Details | Related (2) | Comments (3) | Cite | Save

Mirror: http://phet.colorado.edu/sims/cir...

Access Rights: *Free access*

Restriction: © 2004 PHET and University of Colorado
PhET Interactive Simulations by The PhET Team, University of Colorado are licensed under a Creative Commons Attribution-

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PSRC Status: **R**
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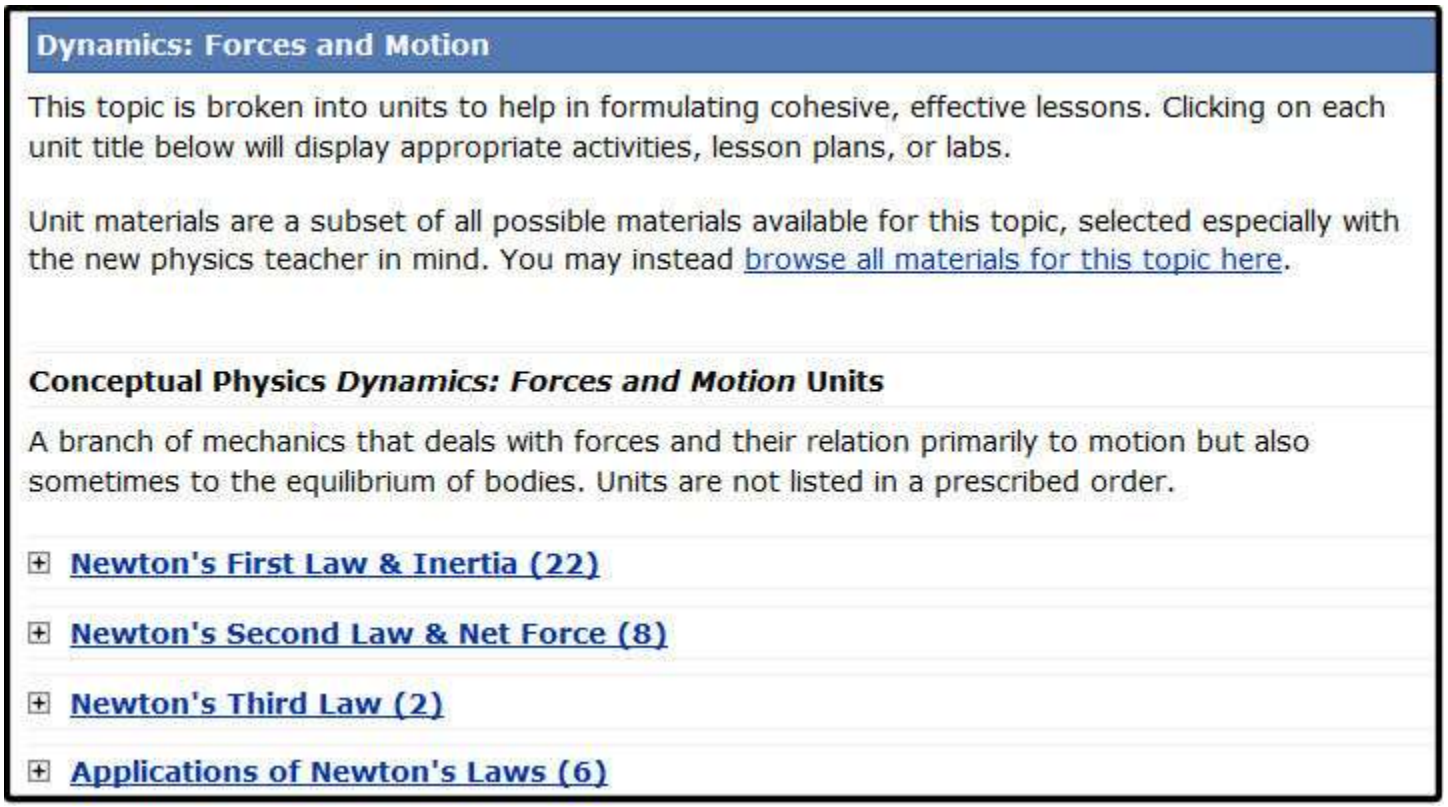
Related Materials
Expanded On
PhET Simulation: Circuit Construction Kit (AC+DC)

Covers the Same Topic As
Phyzlab: Open and Short Case - An Investigation of Faulty Circuits

See details...

Similar Materials
PhET Simulation: Battery-Resistor Circuit
Multimeter VOM

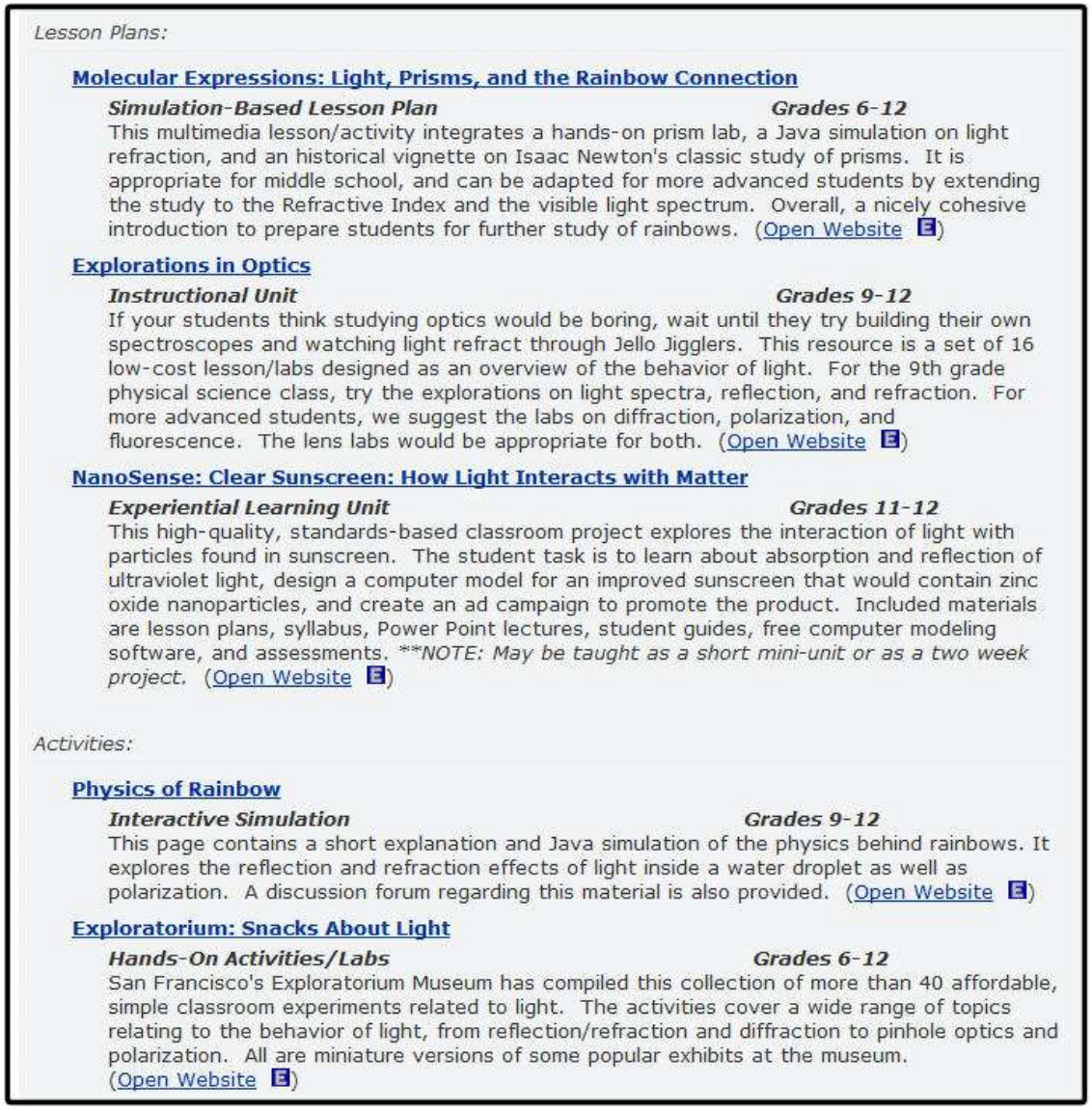
Physics Front: Topics & Units



Editor Selections, particularly for new teachers

Sorted by Course, Topic, Specific Content, Type

Physics Front: Topics & Units Content



Lesson Plans:

Molecular Expressions: Light, Prisms, and the Rainbow Connection

Simulation-Based Lesson Plan ***Grades 6-12***

This multimedia lesson/activity integrates a hands-on prism lab, a Java simulation on light refraction, and an historical vignette on Isaac Newton's classic study of prisms. It is appropriate for middle school, and can be adapted for more advanced students by extending the study to the Refractive Index and the visible light spectrum. Overall, a nicely cohesive introduction to prepare students for further study of rainbows. (Open Website E)

Explorations in Optics

Instructional Unit ***Grades 9-12***

If your students think studying optics would be boring, wait until they try building their own spectroscopes and watching light refract through Jello Jigglers. This resource is a set of 16 low-cost lesson/labs designed as an overview of the behavior of light. For the 9th grade physical science class, try the explorations on light spectra, reflection, and refraction. For more advanced students, we suggest the labs on diffraction, polarization, and fluorescence. The lens labs would be appropriate for both. (Open Website E)

NanoSense: Clear Sunscreen: How Light Interacts with Matter

Experiential Learning Unit ***Grades 11-12***

This high-quality, standards-based classroom project explores the interaction of light with particles found in sunscreen. The student task is to learn about absorption and reflection of ultraviolet light, design a computer model for an improved sunscreen that would contain zinc oxide nanoparticles, and create an ad campaign to promote the product. Included materials are lesson plans, syllabus, Power Point lectures, student guides, free computer modeling software, and assessments. ***NOTE: May be taught as a short mini-unit or as a two week project.* (Open Website E)

Activities:

Physics of Rainbow

Interactive Simulation ***Grades 9-12***

This page contains a short explanation and Java simulation of the physics behind rainbows. It explores the reflection and refraction effects of light inside a water droplet as well as polarization. A discussion forum regarding this material is also provided. (Open Website E)

Exploratorium: Snacks About Light

Hands-On Activities/Labs ***Grades 6-12***

San Francisco's Exploratorium Museum has compiled this collection of more than 40 affordable, simple classroom experiments related to light. The activities cover a wide range of topics relating to the behavior of light, from reflection/refraction and diffraction to pinhole optics and polarization. All are miniature versions of some popular exhibits at the museum. (Open Website E)

Units may include:

- Lesson Plans
- Activities
- References
- Content Support
- Student Tutorials
- Assessments

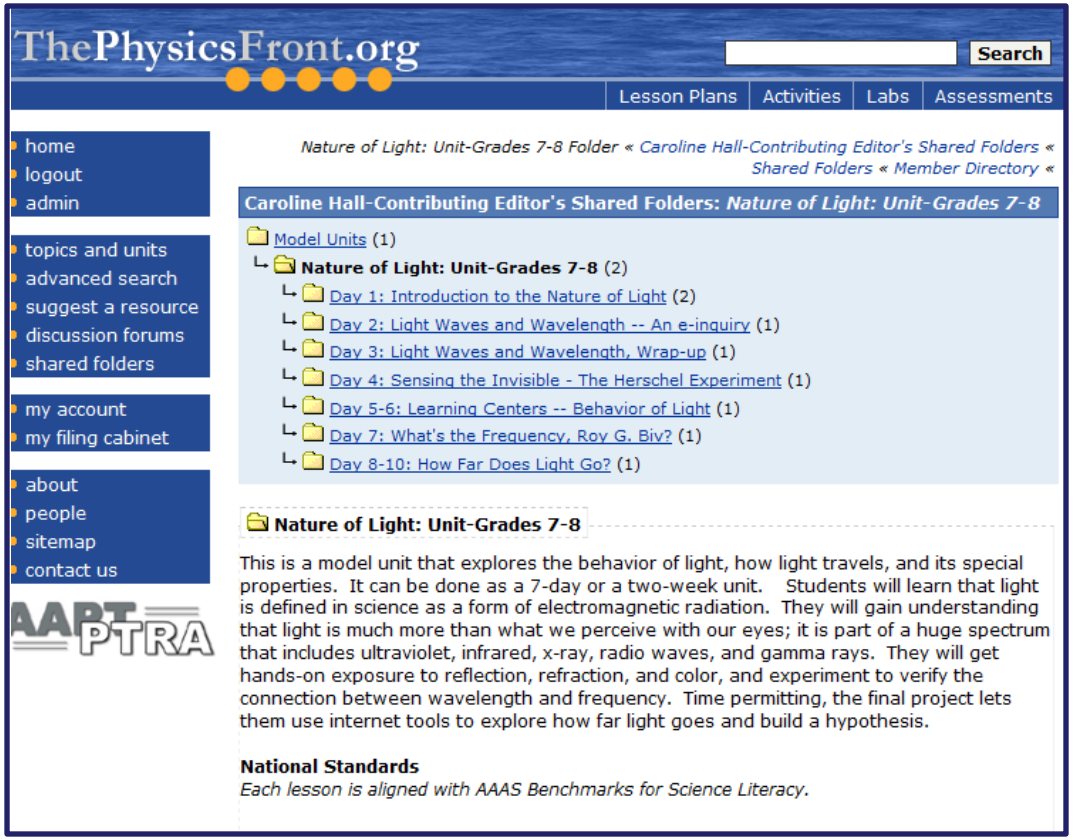
comPADRE
Resources for Physics & Astronomy Education

NSDL 2010

Physics Front: Topics & Units Usage

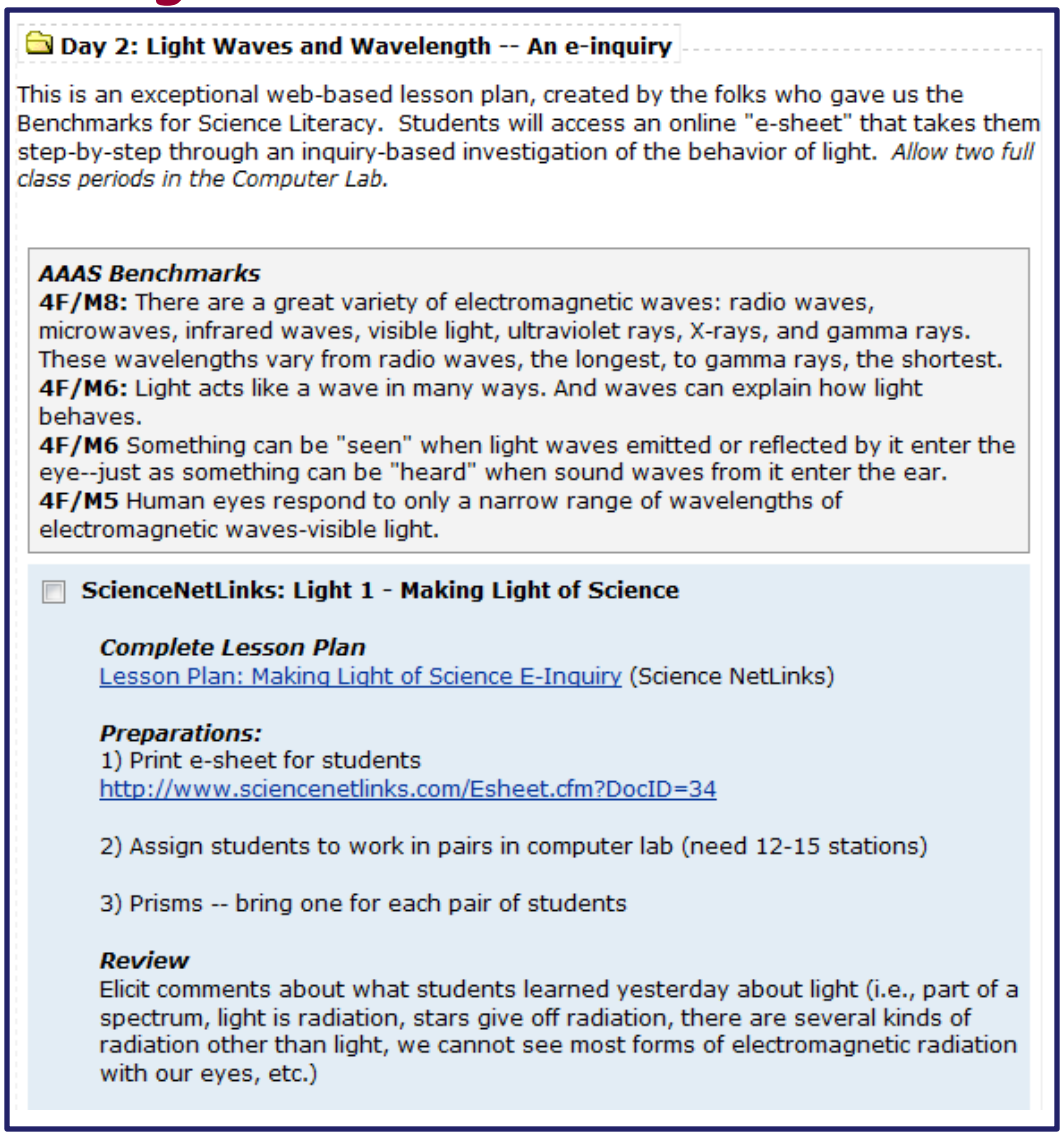
- About 26% of page views are Topics & Units pages (Catalog pages 55%)
- Usage larger than search and homepage
- Growth in usage generally between 50% and 200% between 2008/09 and 2009/10
- Avg. of 2 min. on page, less than 50% exits

Physics Front: Model Teaching Units



- **Editor-recommended approach to topic**
- **Unified content, activities, and support**

Physics Front: Model Teaching Units



Day 2: Light Waves and Wavelength -- An e-inquiry

This is an exceptional web-based lesson plan, created by the folks who gave us the Benchmarks for Science Literacy. Students will access an online "e-sheet" that takes them step-by-step through an inquiry-based investigation of the behavior of light. *Allow two full class periods in the Computer Lab.*

AAAS Benchmarks
4F/M8: There are a great variety of electromagnetic waves: radio waves, microwaves, infrared waves, visible light, ultraviolet rays, X-rays, and gamma rays. These wavelengths vary from radio waves, the longest, to gamma rays, the shortest.
4F/M6: Light acts like a wave in many ways. And waves can explain how light behaves.
4F/M6 Something can be "seen" when light waves emitted or reflected by it enter the eye--just as something can be "heard" when sound waves from it enter the ear.
4F/M5 Human eyes respond to only a narrow range of wavelengths of electromagnetic waves-visible light.

ScienceNetLinks: Light 1 - Making Light of Science

Complete Lesson Plan
Lesson Plan: Making Light of Science E-Inquiry (Science NetLinks)

Preparations:
1) Print e-sheet for students
http://www.sciencenetlinks.com/Esheet.cfm?DocID=34

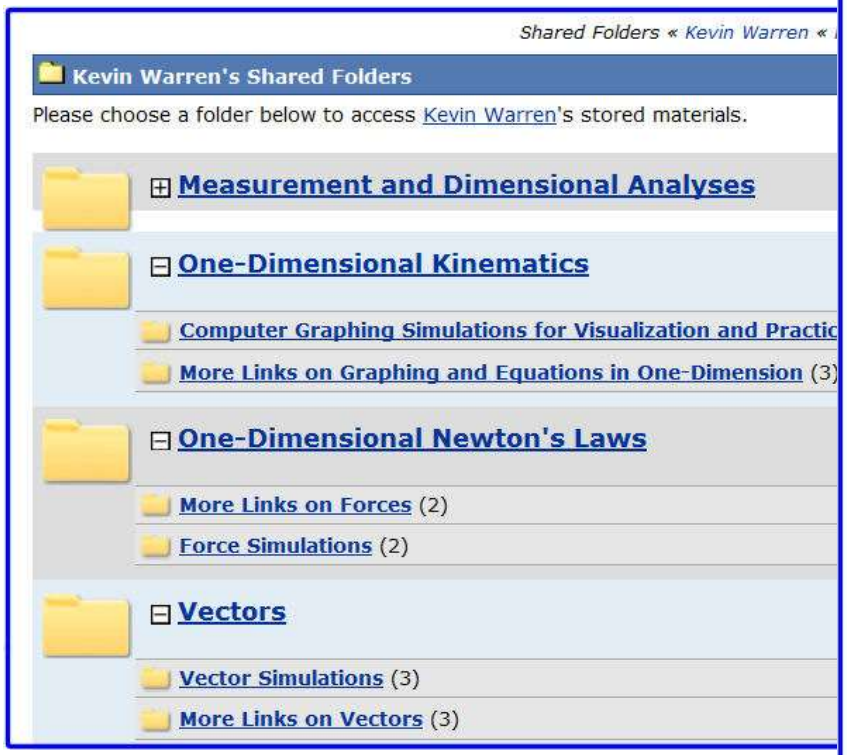
2) Assign students to work in pairs in computer lab (need 12-15 stations)

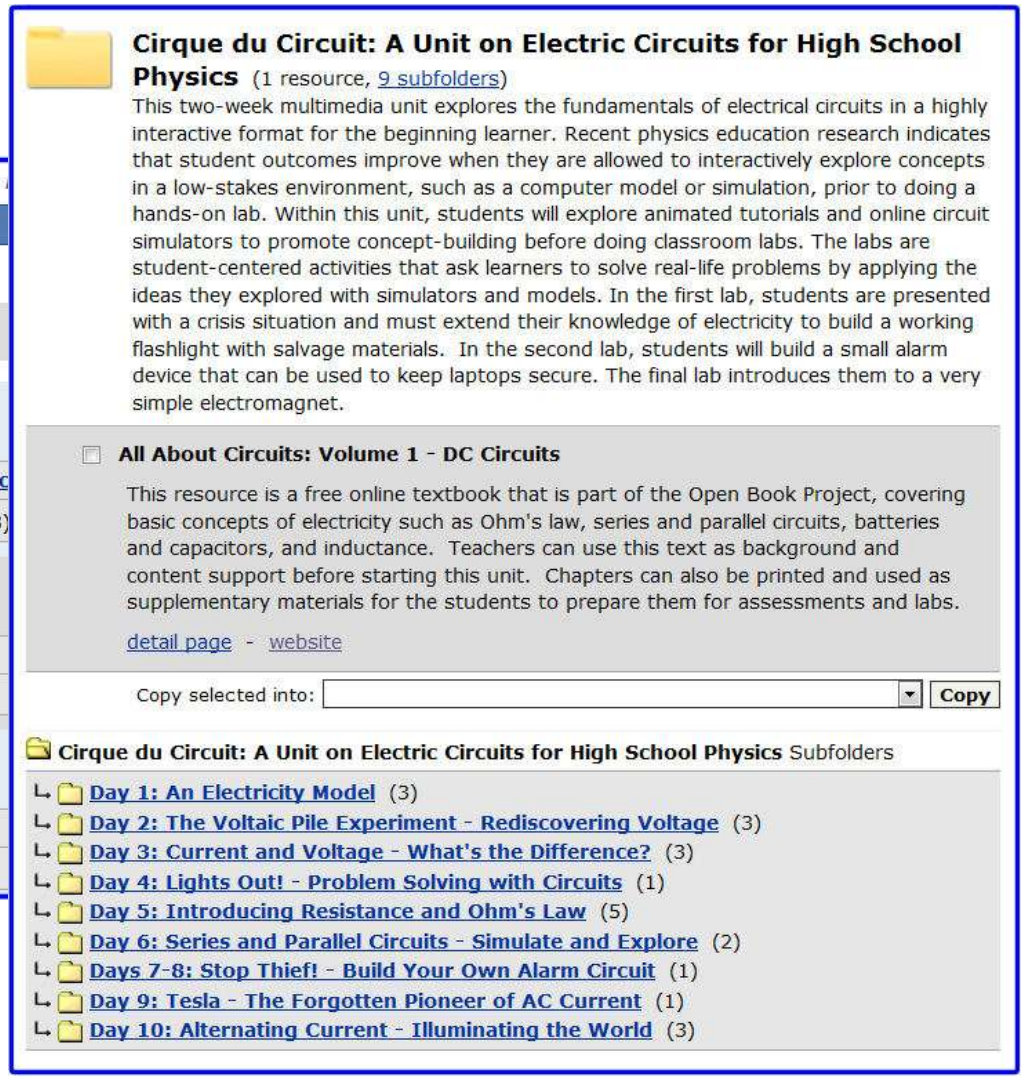
3) Prisms -- bring one for each pair of students

Review
Elicit comments about what students learned yesterday about light (i.e., part of a spectrum, light is radiation, stars give off radiation, there are several kinds of radiation other than light, we cannot see most forms of electromagnetic radiation with our eyes, etc.)

- **Introduction**
- **Standards, Challenges**
- **Link to Content and Teaching Resources**
- **Wrap-up**

Shared Context: Personalization





Relations: Content to Content

SEI: Junior E&M I Course Materials Relations

PSRC Related Resources

SEI: Junior E&M I Course Materials Contains SEI: Junior E&M Course Materials - Concept Tests/Clicker Questions

These concept tests were developed as part of the SEI Junior Level E&M Course reform.

relation by Bruce Mason
Priority: Important
edit - remove

SEI: Junior E&M I Course Materials Contains SEI: Junior E&M Course Materials - Electric Fields in Matter

The Electric Fields in Matter materials cover dielectrics, polarization, and boundary value problems.

relation by Bruce Mason
Priority: Important
edit - remove

SEI: Junior E&M I Course Materials Contains SEI: Junior E&M Course Materials - Homework

This homework problem set is created for the research-based Junior E&M I course.

relation by Bruce Mason
Priority: Important
edit - remove

SEI: Junior E&M I Course Materials Contains SEI: Junior E&M Course Materials - Math Fundamentals

- **Relations provide structure of content**

Relations: Pedagogical Context

Website Detail Page

Windows to the Universe®: Order it Up

published by the Windows to the Universe Team

Available Languages: English, Spanish

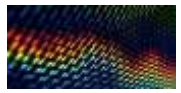
This online Java game tests knowledge of the solar system. Players are required to rank solar system objects by their properties, such as radius, density, and orbital period. Three versions are available for beginning, intermediate, and advanced students.

Additional context for this material is provided by the ComPADRE-SERC Pedagogic Service.

http://www.windows2universe.org/games/order_planets_intro.html

Subjects	Levels	Resource Types
Astronomy - Astronomy Education = Assessment - Solar System	- Lower Undergraduate - High School	- Instructional Material = Activity = Game = Problem/Problem Set

- **Make connections to SERC modules**
- **Make connections to Phys. Ed. Research**

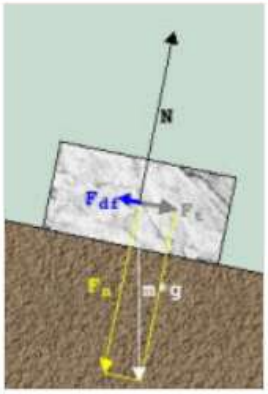


Context through Standards

Computer Program Detail Page

Sliding Down an Incline Plane Model

written by Francisco Esquembre



This interactive simulation shows a stone block lying at rest on an inclined plane. Initially, the component of gravity along the plane surface is exceeded by the force of static friction. The slope of the ramp can be increased or decreased, allowing students to see the exact point when the component of gravity equals the force of static friction. If the ramp is raised any further, the block will slide down. The coefficient of static friction is set at 0.2. As the slope is increased or decreased, students will see changing numerical values for the gravitational component, the force of static friction, and the force of kinetic friction.

See Annotations (below) *for two editor-recommended interactive tutorials that take students step-by-step through exercises designed to help them form a conceptual basis for solving problems related to objects moving on an inclined plane.*

This item was created with Easy Java Simulations (EJS), a modeling tool that allows users without formal programming experience to generate computer models and simulations. To run the simulation, simply click the Java Archive file below. To modify or customize the model, ***See Related Materials*** *for detailed instructions on installing and running the EJS Modeling and Authoring Tool.*

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Standards (5)
Annotations (2)

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Related Materials

Is Based On
Easy Java Simulations Modeling and Authoring Tool

Covers the Same Topic As

- **Good: Ready-to-use Context**
- **Bad: Everyone wants something different**