SMETE.ORG, NEEDS and MERLOT

Brandon Muramatsu
The SMETE Open Federation is an e-learning partnership that:

- Offers a comprehensive collection of SMET education content and services to learners, educators, and academic policy-makers.
- Serves as the integrative organization and distribution mechanism for pedagogical material through a tightly coupled federation of digital libraries.
- Promotes educational reform through participatory communities of learners.
Reach of the Open Federation

- Identifiable audience of **9.25 million** users
- About **250,000** directly accessible community members
- Collectively has **42,000** high-quality, web-accessible digital learning resources
  - 28% Math
  - 17% Physical Sciences (physics, chemistry)
  - 19% Life Sciences
  - 4% Engineering
  - 3% Computer Science
  - **29%** Non-STEM (History, World languages, etc.)
- **K-12/Higher Education**
  - Higher education resources 65%
  - K-12 education resources 35%
<table>
<thead>
<tr>
<th>SMETE Open Federation</th>
<th>Industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Association for the Advancement of Science (<a href="http://www.aaas.org">www.aaas.org</a>)</td>
<td>Cisco Systems (<a href="http://www.cisco.com">www.cisco.com</a>)</td>
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<tr>
<td>Association of Women in Science (<a href="http://www.awis.org">www.awis.org</a>)</td>
<td>John Wiley &amp; Sons* (<a href="http://www.wiley.com">www.wiley.com</a>)</td>
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<tr>
<td>BioQUEST Curriculum Consortium (<a href="http://www.bioquest.org">www.bioquest.org</a>)</td>
<td>Collegis (<a href="http://www.collegis.com">www.collegis.com</a>)</td>
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<tr>
<td>Coalition for Networked Information (<a href="http://www.cni.org">www.cni.org</a>)</td>
<td>Microsoft Research* (research.microsoft.com)</td>
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<tr>
<td>CITIDEL (<a href="http://www.citidel.org">www.citidel.org</a>)</td>
<td>Sun Microsystems (<a href="http://www.sun.com">www.sun.com</a>)</td>
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<tr>
<td>Computer Science Teaching Center (<a href="http://www.cstc.org">www.cstc.org</a>)</td>
<td>*Involved with NEEDS</td>
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<tr>
<td>Digital Library for Earth Systems Education (<a href="http://www.dlese.org">www.dlese.org</a>)</td>
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<td>Education Development Center (<a href="http://www.edc.org">www.edc.org</a>)</td>
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<tr>
<td>Eisenhower National Clearinghouse for Mathematics and Science Education (<a href="http://www.enc.org">www.enc.org</a>)</td>
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<td>iLumina (<a href="http://www.ilumina-project.org">www.ilumina-project.org</a>)</td>
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<tr>
<td>Instructional Architect (ia.usu.edu)</td>
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<td>Interactive University (iu.berkeley.edu)</td>
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<tr>
<td>Internet Scout (scout.cs.wisc.edu)</td>
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<tr>
<td>Learning Matrix (thelearningmatrix.enc.org)</td>
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<tr>
<td>LearningOnline Network with CAPA (<a href="http://www.lon-capap.org">www.lon-capap.org</a>)</td>
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<td>Mathematics Association of America (<a href="http://www.maa.org">www.maa.org</a>)</td>
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<td>MathDL (<a href="http://www.mathdl.org">www.mathdl.org</a>)</td>
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<td>Math Forum (<a href="http://www.mathforum.com">www.mathforum.com</a>)</td>
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<tr>
<td>MERIT Network &amp; Michigan Teacher Network (<a href="http://www.merit.edu">www.merit.edu</a>)</td>
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<tr>
<td>MERLOT (<a href="http://www.merlot.org">www.merlot.org</a>)</td>
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<tr>
<td>National Action Council for Minorities in Engineering (<a href="http://www.nacme.org">www.nacme.org</a>)</td>
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<tr>
<td>National Center for Supercomputer Applications (<a href="http://www.ncsa.org">www.ncsa.org</a>)</td>
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<tr>
<td>NEEDS—A Digital Library for Engineering Education* (<a href="http://www.needs.org">www.needs.org</a>)</td>
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<td>Project Kaleidoscope (<a href="http://www.pkal.org">www.pkal.org</a>)</td>
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<tr>
<td>University of California Teaching and Learning with Technology Center (<a href="http://www.uctltc.org)">www.uctltc.org)</a></td>
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Key Features available at www.smete.org

• Users can...
  – Search and browse for learning resources
  – Access content from “federated” collections
  – Catalog (add) learning resources
    • Based upon emerging international IEEE standards
  – Evaluate the quality of learning resources
    • Using “user” reviews and “expert” reviews
  – Form a community
    • Through partner collections and activities
    • Building upon PKAL workshops and seminars
  – Get personalized recommendations
Federated Collections

• From Andi’s JCDL Poster
Professional Societies

• American Association for the Advancement of Science
  – Biosci Ed Net Project (www.benproject.org)
  – Metadata, federated search, shared services

• Mathematical Association of America
  – MathDL Project (www.mathdl.org)
  – Controlled vocabulary of educational concepts in mathematics
• Collaborative to improve access to quantity and quality of teaching and learning resources and to help faculty identify and use those materials

• Institutional partnerships with 20+ systems of higher education in the U.S. and Canada
  – Reaching 8 Million students
  – 350,000 faculty

• Broad collection extending beyond STEM
  – Search, browse, catalog, comments, assignments
  – Including: History, Music, World Lang., etc.

• 13 Disciplines doing peer review
  – Including engineering in collaboration with NEEDS
Institutional Partners

- California Community College System
- California State University
- CAREO
- Council of Independent Colleges
- Illinois Board of Higher Education
- Indiana Commission for Higher Education
- Louisiana Board of Regents
- Oklahoma State Regents for Higher Education
- South Dakota Board of Regents
- State University of New York
- Tennessee Board of Regents
- Troy State University
- University of Michigan
- University of North Carolina
- University System of Georgia
- University of Wisconsin System
- Virginia Community College System
- Western Cooperative for Educational Telecommunications
MERLOT is a free and open resource designed primarily for faculty and students of higher education. Links to online learning materials are collected here along with annotations such as peer reviews and assignments.

MERLOT is also a community of people who are involved in education. Community members help MERLOT grow by contributing materials and adding assignments and comments. Many community members make their professional information available in MERLOT's member directory.

You are welcome to browse the collection or search for materials. Members may add materials, comments and assignments to MERLOT. Membership is free.

What will I see when I look at a learning material?
What can I do with the materials I find in MERLOT?
Who contributes the materials to MERLOT?
Who oversees and maintains MERLOT?

Highlights

Learn more about the MERLOT project by visiting the Tasting Room.
Read about the Peer Review process and find reviewed materials.

Read about the annual MERLOT International Conference.
Read about assignments and find materials with assignments.

See the calendar of recent events and announcements.
See the recent additions to the MERLOT collection.
Click on the symbol to see sub-categories. Click on the category name to see items in that category.

Browse Path: All > Science and Technology

Agriculture (14)  Astronomy (121)  Biology (432)
Chemistry (177)  Computer Science (360)  Engineering (236)
Geology (47)  General Science (34)  Health Science (156)
Information Technology (347)  Physics (1422)

Results Path: All > Science and Technology

Your search found 3179 materials

Category: All/Science and Technology

Items 1 - 10 shown.

<table>
<thead>
<tr>
<th>Title</th>
<th>Author</th>
<th>Date Entered</th>
<th>Rating</th>
<th>Item Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ideal Gas Law Simulation (Simulation)</td>
<td>John Gelder, Kirk Haines &amp; Mike Abraham</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Microbiology Education Resources (Collection)</td>
<td></td>
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An effective tool to help students learn about all aspects of the ideal gas law.
One of the best ...
Location: http://intro.chem.okstate.edu/1314F00/Laboratory/GLP.htm
Add: Feb 19, 2001

Peer Reviews (1) avg: ★★★★★
Member Comments (1) avg: ★★★★★
Assignments (none)

Peer Reviews (1) avg: ★★★★★
Member Comments (3) avg: ★★★★★
Assignments (none)
### Physlets, FEATURE

<table>
<thead>
<tr>
<th>Details</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td><strong>Average Ratings:</strong></td>
<td>Peer Reviews: ★★★★★&lt;br&gt;Member Comments: ★★★★★</td>
</tr>
<tr>
<td><strong>Type:</strong></td>
<td>Collection</td>
</tr>
<tr>
<td><strong>Location:</strong></td>
<td><a href="http://webphysics.davidson.edu/Applets/Applets.html">http://webphysics.davidson.edu/Applets/Applets.html</a></td>
</tr>
<tr>
<td><strong>Primary Subject Category:</strong></td>
<td>- Science and Technology/Physics/General/Collections&lt;br&gt;- Science and Technology/Physics/General/Curriculum</td>
</tr>
<tr>
<td><strong>Author:</strong></td>
<td>Wolfgang Christian&lt;br&gt;Davidson College</td>
</tr>
<tr>
<td><strong>Description:</strong></td>
<td>Educational physics applets designed to be scripted in JavaScript for use in quizzes, homework problems, and Just in Time Teaching activities. Includes applets that can be used in a wide range of classes and at different levels.</td>
</tr>
<tr>
<td><strong>Submitted by:</strong></td>
<td>Bethany Gross</td>
</tr>
<tr>
<td><strong>Primary Audience:</strong></td>
<td>High School, College</td>
</tr>
<tr>
<td><strong>Technical Format:</strong></td>
<td>Java Applet</td>
</tr>
<tr>
<td><strong>Technical Requirements:</strong></td>
<td>Requires a browser that allows communication between Javascript and Java applets. There are some difficulties with Macintosh computers running OS 9 and lower.</td>
</tr>
<tr>
<td><strong>Version:</strong></td>
<td>3 and 4</td>
</tr>
<tr>
<td><strong>Language:</strong></td>
<td>English</td>
</tr>
</tbody>
</table>
Peer Review of Physlets by Wolfgang Christian, author.
Reviewed: Jul 25, 2002 by the MERLOT Physics Review Panel

Overall Rating: 5
Category Ratings:
- Content Quality: 5
- Potential Effectiveness as a Teaching Tool: 5
- Ease of Use for Students and Faculty: 5

About the Evaluation Process, Criteria, and Ratings

Description

Overview: Physlets is a collection of small, simple Java applets that can be used to simulate or demonstrate a wide range of physical phenomena. Materials covered by these applets include mechanics, electricity and magnetism, optics, waves, modern physics, and quantum mechanics. Because they can be scripted, they can be used in many different settings and for many different learning activities.

Learning Goal(s): Varied, but Physlets are particularly suited for hands-on, interactive conceptual learning.

Target Student Population(s): All

Prerequisite Knowledge or Skills: Depends on the use of the material.

Type of Material: Java applets suitable for tutorials, interactive quizzes and homework, online instruction, pre-labs or virtual lab exercises, demonstrations.
MERLOT Peer Review

• **Convenes Discipline Community-based Workshop**
  – Adopt evaluation standards (based on common core)
    • Quality of content
    • Potential effectiveness for teaching and learning
    • Ease of Use
  – Develop and implement peer review process
  – Understand roles and responsibilities as MERLOT reviewers

• **Editorial Board**
  – Editors (usually from MERLOT Institutional Partners)
  – Board members and Associate editors (new, being implemented over the next year)
  – “External” peer reviewers (new, being implemented over the next year)
Peer Review Process

• **Materials in MERLOT are triaged**
  – Definitely Review, Possibly Review, Not worth reviewing

• **Selected materials get assigned to 2 members of discipline community**

• **Evaluate materials and if meets minimum criteria, MERLOT posts review**

• **Editorial Board members write a joint review posted at MERLOT**
  – Dialog with authors
  – Successful peer reviews acknowledged with letters to Deans, Department Chairs, etc.
Criteria (General)

- **Quality of Content**
  - Present valid (correct) and educationally significant concepts, models, skills?

- **Potential Effectiveness as a Teaching/Learning Tool**
  - What stages in the learning process/cycle can the materials be used?
  - What are the learning objectives?
  - What are the characteristics of the target learner?

- **Ease of use**
  - Navigation, flexibility, interface, etc.
Professional Societies

• American Association of Physics Teachers*
  – COMPADRE
  – Metadata, federated search, shared services

• Journal of Chemical Education*
  – Metadata, shared peer reviews and evaluation criteria
NEEDS—www.needs.org

• Established circa 1992 from NSF Synthesis Coalition (engineering education reform)
• Collection of digital learning resources for engineering education (search, browse, catalog)
• Served as technology platform for SMETE.ORG
• Recently re-launched to incorporate advances from SMETE.ORG
• Conducts Premier Award for Excellence in Engineering Education Courseware
Welcome to the new home for NEEDS

NEEDS — The National Engineering Education Delivery System is a digital library of learning resources for engineering education. NEEDS provides web-based access to a database of learning resources where the user (whether they be learners or instructors) can search for, locate, download, and comment on resources to aid their learning or teaching process. In addition NEEDS supports a multi-tier evaluation system from our national award competition sponsored by John Wiley and Sons, Inc. to user-based reviews of individual learning resources.

2002 Premier Award Competition Call for Submissions

Submission Deadline: Friday, July 12, 2002, 5 p.m. PT

We welcome your submissions for the 2002 Premier Award. The Premier Award competition is open to a wide range of submissions of "high-quality, non-commercial courseware designed to enhance engineering education." Please visit our 2002 Premier Award Submission page for more information.
Learning Resource: The Virtual Disk Drive Design Studio

Title: The Virtual Disk Drive Design Studio
Authors: David Y. Yu, Alice Merner Agogino
Publishers: University of California at Berkeley
Courseware Series: Multimedia Case Studies of Design in Industry
Summary: The Multimedia Virtual Disk Drive Design Studio is an engineering design case study using interactive multimedia courseware for undergraduate engineering and science students. The purpose of this multimedia case is to introduce students to the world of mechatronics in the form of a disk drive. Students play the role of a project engineer for the ACME disk drive company and will have to mine out the necessary information from a multimedia archive in order to build a new disk drive model. Students will have to keep track of the development and production costs. They will also be asked to launch their new disk drives in a certain time frame, simulating the idea of time-to-market. This interactive disk drive case study is ideally complemented by hands-on mechanical dissection of an actual disk drive. This entire project is put together using Macromedia Director. This cross-platform software will allow us to distribute CD-ROMs to a wide spectrum of students around the country with 2x CD-ROM drives. The author is currently collaborating with Western Digital Corporation and IBM Almaden Research Center in San Jose. Western Digital Corp. provided the
My Community: Recommended Members and Learning Resources

Based on your profile and the learning resources you have downloaded, we have found members of the NEEDS community who have interests similar to yours. Listed are some of the learning resources that they have downloaded:

Greg from UC Berkeley
- Chemist's Art Gallery
- Rapid Prototyping
- Applied Computer Visualization and Planning for Construction Engineers
- Math activities for K-12 teachers
- Mattel Color Spin: A Multimedia Case Study in Engineering Design

Jialong from Not Specified
- Visual Quantum Mechanics
- AC Power Analysis and Design
- Mattel Color Spin: A Multimedia Case Study in Engineering Design
- Department of Pharmacology and Experimental Therapeutics
- Usability: The New Dimension of Product Design

Alice from UC Berkeley
- The Engineering Design Process
- BGESS Home Base: Historic Contributions of Black Scientists and Engineers
- Usability: The New Dimension of Product Design
- Cracking Dams
- Visualizing Molecules

Rickard from Not Specified
Professional Societies

• American Society for Engineering Education**
  – Communities of practice

• Institute for Electrical and Electronics Engineers**
  – Peer review, controlled vocabulary development