



**CONNECTING**  
Science  
Mathematics  
Engineering  
Technology  
Education

## Building the SMETE.ORG Alliance

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- **Working Assumptions**
- **SMETE.ORG Vision**
  - Commitment and Philosophy
- **Developing the Organization**
- **Making Everything Work Together**
  - Interoperability and Federated Search

- **To build a successful NSDL for deployment in Fall 2002...**
  - To focus on science, mathematics, engineering and technology
  - And more important, it focuses on *education*
- **...we needed to develop a team...**
  - To overcome the challenges we face in developing a NSDL
  - To cover target audiences and disciplines
  - To share in the development efforts

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## A Digital Learning Community

### **SMETE.ORG, An Alliance of over 20 partners**

- Collections of science, mathematics, engineering and technology learning resources
- Networked distribution of pedagogical material providing seamless access through a tightly coupled federation of educational digital libraries
- Promotes education reform through participatory communities of learners

- **SMETE.ORG Alliance Partners are committed to providing a service...**
  - to the nation
  - to support *learning*
  - across disciplines in science, mathematics, engineering and technology
  - in support of education reform and cross-disciplinary learning
  - from K-12 to higher education to professional development and lifelong learning
  - is standards-based & supports the NSDL Program

- **The difference is *learning*, not just bibliographic information retrieval**
  - Teaching and learning require something more
- **Guided by *user needs* and philosophy of education that is constructivist**
- **Link content to community and services**
- **Build integrative tools and incorporate “best of breed” tools from partners**

# Information Architecture Design Principles

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- **Principle 1: Information Organization**  
Organize information to provide opportunities for students and educators to *create, synthesize, manipulate or debate* content rather than merely to passively receive instruction.
- **Principle 2: Information Labeling**  
Label resources with *pedagogical identifiers* such as age group, teaching method, and academic standards to indicate educational uses.

- **Principle 3: Information Navigation**

*Guide* the collection and adaptation of learning elements towards individual learning goals.

- **Principle 4: Information Search**

Optimize search to meet the *interests, knowledge, understanding, abilities, and experiences* of the users in their roles as educators or students.



- **SMETE.ORG Alliance...**
  - Evolving over time
  - Balancing the diversity, history, needs and strengths of each organization
  - Developing partnerships and affiliations to strengthen the whole
- **...partners identify with SMETE.ORG**

Alliance Partners		Industry	Collaborators
American Association for the Advancement of Science ( <a href="http://www.aaas.org">www.aaas.org</a> )	National Action Council for Minorities in Engineering ( <a href="http://www.nacme.org">www.nacme.org</a> )	Cisco Systems ( <a href="http://www.cisco.com">www.cisco.com</a> )	Biology Education Online/ Access Excellence & National Assoc. Biology Teachers ( <a href="http://www.accessexcellence.org">www.accessexcellence.org</a> and <a href="http://www.nabt.org">www.nabt.org</a> )
BioQUEST Curriculum Consortium ( <a href="http://www.bioquest.org">www.bioquest.org</a> )	NEEDS—National Engineering Education Delivery System ( <a href="http://www.needs.org">www.needs.org</a> )	John Wiley & Sons ( <a href="http://www.wiley.com">www.wiley.com</a> )	Columbia University ( <a href="http://www.earthscape.org">www.earthscape.org</a> )
Coalition for Networked Information ( <a href="http://www.cni.org">www.cni.org</a> )	Project Kaleidoscope ( <a href="http://www.pkal.org">www.pkal.org</a> )	Texas Instruments ( <a href="http://www.ti.com">www.ti.com</a> )	Cornell University ( <a href="http://www.siteforscience.org">www.siteforscience.org</a> )
Digital Library for Earth Systems Education ( <a href="http://www.dlese.org">www.dlese.org</a> )	SRI International, Center for Technology in Learning ( <a href="http://www.cilt.org">www.cilt.org</a> and <a href="http://www.escot.org">www.escot.org</a> )	Eduprise ( <a href="http://www.eduprise.com">www.eduprise.com</a> )	MERLOT ( <a href="http://www.merlot.org">www.merlot.org</a> )
Eisenhower National Clearinghouse for Mathematics and Science Education ( <a href="http://www.enc.org">www.enc.org</a> )	University of California Teaching and Learning with Technology Center ( <a href="http://www.ucop.edu/acadinit/tltc">www.ucop.edu/acadinit/tltc</a> )	Sun Microsystems ( <a href="http://www.sun.com">www.sun.com</a> )	TeacherLib/MERIT Network and Michigan Teacher Network ( <a href="http://www.merit.edu">www.merit.edu</a> )
Interactive University ( <a href="http://iu.berkeley.edu">iu.berkeley.edu</a> )	University of Maryland Baltimore County ( <a href="http://www.umbc.edu/engineering/me/wood.html">www.umbc.edu/engineering/me/wood.html</a> )	WebCT ( <a href="http://www.webct.com">www.webct.com</a> )	University of Missouri Columbia ( <a href="http://cecssrv1.cecs.missouri.edu/NSDLProject">cecssrv1.cecs.missouri.edu/NSDLProject</a> )
Mathematics Association of America ( <a href="http://www.mathdl.org">www.mathdl.org</a> and <a href="http://www.maa.org">www.maa.org</a> )			
Math Forum ( <a href="http://www.mathforum.com">www.mathforum.com</a> )	Utah State University ( <a href="http://ia.usu.edu">ia.usu.edu</a> )		

# Strengths of Partners



- **Partners with existing collections each have a decade of experience providing digital SMETE resources to their target audiences and disciplines**
  - ENC, NEEDS, Math Forum, BioQUEST
- **Most partners each have more than ten years of experience as organizations promoting SMETE reform**
  - AAAS, Project Kaleidoscope, NACME, Mathematical Association of America, SRI International

# Strengths of Partners (cont.)



- **Collections and service providers range from well established collections to incipient collections**
- **Organizations serve full spectrum of audiences**
  - K–12, pre-College, community colleges, liberal arts colleges and universities, public and private research universities, and professional societies
  - Extended affiliations include professional development organizations

- **Various models at work in SMETE.ORG**
  - **Individual partners make new partnerships**
    - **Ex., ENC' s partnership with the Education Development Center (professional development collection) or International Technology Education Association (“T” echnology collection)**
  - **The Alliance adds new partners**
    - **Ex., MERLOT**
  - **Individual partners/projects are themselves a partnership**
    - **Ex., Biosci Ed Net Collaborative, led by AAAS**

- **What do we mean by interoperability?**
  - We want to provide “seamless access to collections and services”
    - Existing and new collections
    - Existing and new services
  - We recognize there are different types of agreements necessary to provide “seamless access”
    - Social
    - Technical

- **Agree to interoperate**
  - Shared principles
  - Shared understanding of the issues
- **Build an identity**
- **Meet to develop common language and technical protocols**





# Technical Aspects of Interoperability

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- **Agree to common methods of representing information**
  - Common metadata to help organize and describe collections
  - Common thesauri/controlled vocabularies to describe resources in consistent manner across collections
- **Agree to common methods for transmitting information**
  - Protocols/specifications/API' s for shared access to contents of collections and services

- **Working definition: Ability to search contents of one collection from another collection**
- **Common database of records**
  - Pointers to either external or internal content
  - Could be cataloged in a single location
  - Could be “contributed” or “harvested” (OAI model)
- **Separate databases with a search gateway**
  - Could search contents of all collections at once
  - Could potentially search from any location to any location
- **Might be multiple types**



- **Approach values independence of collection partners**
  - Will enable search from any partner collection to any other partner collection
- **Is a multi-tier approach:**
  - Working specification issued, initially using http post and name/value pairs
  - Moving toward more formal protocol for learning resources based on SDLIP
  - Using a prototype Z39.50 (and OAI) gateway to link in “primary” resources from traditional libraries

- **Shared User Profiles**
  - Could be a common user profile registry
  - Will have to handle authentication
  - Will probably interface with a digital rights management system
- **Shared Reviews**
  - Could work in similar fashion to learning resources and federated search

# Portal at www.smete.org



The screenshot shows a Netscape browser window with the title "Netscape: www.smete.org: A National SMETE Digital Library". The address bar shows "http://beta.smete.org/". The website features a search bar with the text "Search for Learning Resource:" and a "GO" button. Below the search bar, there are three images: a person at a computer, a person at a computer with a whiteboard, and a person at a computer. To the right of the images is a navigation menu with links: MY PORTFOLIO, COMMUNITY, ABOUT SMETE, ADMINISTRATION, and HELP. The main content area is divided into three sections: "SEARCH TOOLS" with sub-sections "FIND", "RESEARCH", and "BROWSE"; "Welcome to the SMETE Digital Library." with a description of the collection; "News" with a paragraph about the Journal of Online Mathematics and its Applications (JOMA); and "Community" with a paragraph about the National SMETE Digital Library Community Center.

**SEARCH TOOLS**

**FIND:** Know what you want? Find your learning resource quickly.

**RESEARCH:** Not sure what you want? Start your search here.

**BROWSE:** Just looking? Browse through our extensive collection.

Come and **Join the SMETE.ORG Community**

**Welcome to the SMETE Digital Library.**  
The most comprehensive collection of science, math, engineering and technology education content and services.

**News**  
The [Mathematical Association of America](#), a SMETE.ORG Alliance Partner, recently launched the premier issue of the [Journal of Online Mathematics and its Applications](#) (JOMA). JOMA takes advantage of the Web to make modern tools, curricula, and active learning environments more accessible to students and teachers everywhere. Visit [JOMA](#) and find out more about the [MathDL](#) project, too.

**Community**  
[The National SMETE Digital Library Community Center](#) formed to gather and share information from all concerning the present and future of SMETE digital libraries, tools and services, lessons learned, standards used, user studies and publications. Come share your ideas in our [forum](#).

- **Search for learning resources**
  - Three mechanisms, find, research and browse, aimed at levels of knowledge of catalog metadata
  - Locally cataloged collections
  - Partner collections through federated search mechanism
  - Books and journal articles thru Z39.50 gateway (also OAI Gateway)
  - Receive recommendations to learning resources through collaborative filtering system
- **Form a community**
  - Find persons with similar educational goals through people recommender service
  - Participate in online workshops and focus groups
  - Form ad-hoc communities organized around learning resources and user-initiated discussion topics
  - Review and comment on use of learning resources

# Contacting SMETE.ORG



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