NSDL Science Literacy Maps

http://strandmaps.nsdl.org/

Helping teachers connect concepts, standards, and NSDL resources

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BACKGROUND
Based on the learning goals from the AAAS Benchmarks for Science Literacy and the visualizations from the AAAS Atlas of Science Literacy (AAAS Project 2061), the Strand Maps demonstrate the connectedness of ideas and skills that students should develop over time. The maps illustrate learning goals for different grades, and the relationships between goals, for K-12 students across a range of science, technology, engineering, and mathematics (STEM) disciplines.

Benchmarks: Describe what learners should know, or be able to do, at key stages in their education across the STEM disciplines

Strand Maps: Learning progression diagrams illustrating how student understanding changes over time

Map Browser: Interactive graphical interface that helps K-12 teachers and students understand the relationships between science concepts and enables them to find supporting educational resources.

SIGNIFICANCE
Concept browsing interfaces provide navigational cues based on important science concepts that are typically lacking from traditional keyword or field-based search interfaces. Prior research indicates that these types of visual knowledge map representations are useful cognitive scaffolds, helping users lacking domain expertise – such as learners, new teachers, or educators teaching out of area – to understand the macro-level structure of an information space (Hall et al., 1999; Martin, 1994; O'Donnell et al., 2002).

EVALUATION RESULTS
• Controlled study examined influence of interface on cognitive processes of undergraduates (Butcher et al., 2005)
• Compared visual interface and keyword-based interface
• Students focused on science content twice as much using visual interface, as opposed to query construction and surface features

API Features
The interactive maps are generated through the Strand Map JavaScript API, which lets developers embed the maps in Web sites and display educational resources and other information in the maps.

• Used to render interactive strand maps
• Requires no browser plug-ins
• Maps can be embedded in any webpage
• Provides access to all data in information space

Documentation
http://strandmaps.nsdl.org/cms1-2/docs/

USER INTERFACE

Map Selector
Search for a map by entering a keyword into the search box OR choose a topic from the drop-down menu to browse maps

Information Bubble
Locate resources supporting specific concepts and learning goals, aligned standards and related benchmarks.

The NSDL Search Service is used to retrieve Top Picks and Related Resources for each Benchmark shown in the Science Literacy Maps.

OTHER INTERFACES

Map Visualization Engine:
Visual maps are dynamically generated by the SMS

Concept Space Interchange Protocol (CSIP):
Provides benchmark and map information in XML or as dynamically generated visualization.

OAI-PMH Data Provider:
Enables third parties to harvest the information in the benchmark repository.

SMS Tag Library:
A client-side JSP tag library that provides a markup language for rapidly creating strand map based interfaces.

JavaScript API:
Lets web developers insert interactive strand maps into web pages using JavaScript and place custom content into the maps.

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