

## **PRISMS: Phenomena and Representations for the Instruction of Science in Middle Schools**

### **Project Summary**

**Description of Activity:** This proposal, submitted to NSF's National Science, Technology, Engineering, and Mathematics Education Digital Library (NSDL) Selection Services track, involves systematically reviewing and describing phenomena and representations available on the Internet. The review will determine whether resources are aligned with state and national content standards, informed by cognitive research, and likely to improve the quality of middle school science instruction. The highest quality phenomena and representations will be chosen to form a collection of educational resources, PRISMS (Phenomena and Representations for the Instruction of Science in Middle Schools), designed to increase the amount of quality science educational content available in digital libraries for middle school teachers and students. Using AAAS Project 2061's curriculum-materials analysis procedure, a cadre of middle school teachers will analyze approximately 1,200 items for their alignment to middle grades content standards and for the quality of their instructional support for teachers. Based on these analyses, the PRISMS collection will make pointers to aligned items available online, along with rich descriptions and reviews of each item's instructional effectiveness. PRISMS will also include teacher-prepared annotations of items that detail classroom experiences with using the phenomenon or representation, suggested modifications to make the item more effective, and questions that can guide its instructional use. The PRISMS collection will be enriched over time based on input from additional middle school teachers on the usefulness of the reviewed resources.

**Intellectual Merit:** Resources aligned with content standards help educators stay focused on the teaching and learning of the ideas in those content standards. Specifically, aligned phenomena and representations in digital format help teachers provide students with the multiple and varied phenomena they need to understand key science ideas. These virtual, indirect experiences bring real-world phenomena into the classroom that are often not otherwise available. This is the first time that Project 2061's research-based criteria for curriculum materials analysis, which have been used successfully with textbooks, will be applied extensively to online materials. By using these well-established criteria to develop a systematic approach to reviewing middle school content for inclusion in the NSDL, the PRISMS partners will not only provide a repository of phenomena and representations for use by other digital library collections and science education reform efforts, but also illustrate how research can inform the selection of educational resources in digital libraries.

**Broader Impacts:** With the passage of the federal No Child Left Behind Act and its mandate that states begin measuring how well their students meet their science standards by 2007, the demand and need for resources and supporting materials that target specific learning goals has become even more urgent. This project responds to this need and contributes to the advancement of standards-based reform more generally by providing educators with high-quality, easily accessible resources that are aligned with content standards and support effective instructional strategies. Middle school is a transition time when students need a variety of challenging opportunities to expand, change, enhance, and modify the ways in which they view the world. PRISMS will broaden these opportunities for middle school students to engage in rigorous scientific thinking and potentially provide a new vehicle for classroom teachers and researchers to learn more about students' thinking, as they use digital phenomena and representations.