

**Executive Summary**  
**Evaluation Report for BSCS Keys to Science Institutes**  
***Scientific Inquiry: Research & Practice***  
**July 15-20, 2007**  
***Evolution across the Sciences***  
**July 29-August 3, 2007**  
**Colorado Springs, CO**



## **Background**

Two BSCS Keys to Science Institutes were offered in Colorado Springs during the summer of 2007.

- *Scientific Inquiry: Research and Practice*, with 25 participants from 7 states.
- *Evolution across the Sciences*, with 11 participants from 5 states, the District of Columbia, and Singapore.

Both Institutes involved intense, week-long, face-to-face experiences, as well as a year-long, on-line forum to extend the impact and support into the school year. Pre/post measures showed significant gains in content knowledge, pedagogical knowledge, and abilities and understandings of scientific inquiry in both Institutes. Overall, participants described the Institutes as invigorating, educational, and valuable experiences.

## **Evaluation Plan**

Data were collected and synthesized from online forum postings, daily institute reflections, cumulative session ratings, retrospective pre- and post- ratings of understanding and abilities (*Inquiry* institute only), and open-ended comments.

### ***I. Scientific Inquiry: Research and Practice***

Data indicate that the BSCS Keys to Science *Scientific Inquiry: Research and Practice Institute* provided effective professional development. The Institute featured the following professional development strategies:

- The pre-institute online forum introduced participants and involved them in exchanges of beliefs and values on the aspects of scientific inquiry.
- A comprehensive inquiry-focused institute agenda engaged the educators in 'content deepening' experiences both as learners and as practitioners, enhancing their understandings of scientific inquiry and its integration into their classroom.
- Finally, continued discussion via the online forum has begun to illuminate teachers' challenges and discoveries in applying the understandings and abilities gained from the institute.

On retrospective pre/post assessments of understandings and abilities of scientific inquiry, participants registered statistically significant gains on all items. On the final evaluation, 96% of the participants indicated they are very likely to USE the course content, and 83% are very likely to SHARE the course content with colleagues. ."

### ***II. Evolution Across the Sciences***

Data indicate that the BSCS Keys to *Evolution Across the Sciences Institute* also provided a rich learning experience for participants. The Institute featured the following professional development strategies:

- The pre-institute online forum engaged all participants in discussions about science, the scientific process, and inquiry-based classroom pedagogy.
- The *Evolution* institute employed engaging activities as vehicles to teach content (geologic, stellar and biologic evolution) and inquiry-based instructional strategies.
- To date, 2/3 of the group has continued to communicate through the online forum in participant-initiated discussions.

On the final evaluation, 73% of the *Evolution* institute participants indicated it is 'very likely' they would USE the course content, and 73% said they are very likely to SHARE the course content. All data indicate that this institute met its goal as a 'content deepening experience' to develop theoretical and practical understandings of evolution through inquiry-based instructional strategies.

### **III. *BSCS Keys to Science Institutes 2007 General Summary and Evaluation***

Comments from both institutes highlighted the quality of the professional development experience: challenging agendas, modeled strategies, facilitated learning, and provided time for reflection and collaboration. Most effective elements included collaborative learning and group reflections, active hands-on learning activities, dual roles for participants (reflecting and learning as both teachers and as learners), and unique field experiences guided by outstanding facilitators. 100% of the participants indicated that this was a good use of their time and a valuable learning experience.

#### ***Recommendations***

##### *Future content.*

Participants enthusiastically rated both institutes highly and stated their desire for colleagues to attend future BSCS Keys summer institutes. When asked to suggest topics for future professional development experiences beyond the existing topics, two types of recommendations were offered. First mentioned were content-specific topics such as molecular genetics, environmental science/ecology, earth science, biotechnology, genetics, geology, physics, oceanography, chemistry, meteorology, more astronomy, Big Ideas in biology, evolution, energy transfer, and diversity of life.

The second category of suggestions dealt with instructional practice – requests for instruction on lab formats, good questioning, use of internet and resources, effective science lesson planning, practice in analyzing the conceptual progression, integrating inquiry across the disciplines, K-12 articulation, and using inquiry K-12.

##### *Online forum.*

Based on participant responses to the online forums, it is recommended that expectations and methods be developed to encourage continued, more frequent interaction with this means of participant-driven professional development in the months following the summer institutes. This would serve to strengthen the impact of the institute on classroom practice as teachers reflect upon and analyze their inquiry-based pedagogy and then share the information with their colleagues through the forum.