

## SUMMARY

### RESULTS FROM THE INDEPENDENT EVALUATION OF THE SEMINARS ON SCIENCE

Inverness Research<sup>i</sup> studied the American Museum of Natural History's Seminars on Science program for eight years, from its inception in 1998 to 2006. We focused on the following research questions:

- ◆ What is the quality and rigor of the science content?
- ◆ What is the nature of the course-taking experience for teachers?
- ◆ To what extent do teachers actually gain access to working scientists and AMNH resources?
- ◆ How well organized and facilitated are the courses?
- ◆ How do the courses benefit teachers as adult learners?
- ◆ How do the courses benefit teachers in their role as educators?
- ◆ To what extent and in what ways can teachers use what they learn in their own teaching?
- ◆ How do teachers believe their students benefit?
- ◆ How do the courses appear to add value to districts' standards-based science initiatives and professional development programs?

We gathered data that represented different views on the courses. To get the perspectives of the teachers taking the courses, we conducted annual surveys and in-depth interviews over 6 years. To gain an independent perspective of the scientific quality and professional value of the courses, we asked experts in the field of science education to critically review the courses and teachers' experiences in them. And to ascertain the relevance and value of the courses as professional development that could support a variety of local science reform initiatives, we asked district science administrators in several different states to conduct critical reviews of the courses.

### UNIQUE FEATURES OF SEMINARS ON SCIENCE

We have studied dozens of professional development projects in science over the past twenty years. Seminars on Science stands out as a new kind of professional development resource for science education. First, SOS courses place *AMNH's world-class scientists at the center, sharing their knowledge, questions, and investigations with teachers*. All SOS courses focus on the real ongoing inquiries of museum scientists and their colleagues around the world. The courses put their cutting edge work in the context of key big ideas in science, including biodiversity and evolution, as well as current social and ethical issues. Also, courses make use of *on-line learning technologies to bring the scientific resources of the AMNH to teachers across the nation*. Only a small proportion of the nation's teachers can visit the halls of the AMNH or join an expedition. SOS courses give teachers access to the AMNH in their homes and classrooms, and can involve teachers in nationwide learning communities. Finally, SOS courses aim to *inspire teachers as adult learners of science*. SOS courses mean to give teachers the experience of learning science as the best route to strengthening their teaching of it. SOS courses were carefully designed and pilot-tested with practicing teachers to create a synergy among these distinct features.<sup>ii</sup>

## HOW SOS COURSES AIM TO STRENGTHEN SCIENCE TEACHING

Unlike many courses designed for teachers, SOS courses are not about the teaching of science *per se*. That is, they do not focus on pedagogical theory. Rather, the courses are about science itself – the questions that working scientists ask, the ways they investigate questions, the knowledge that scientists have and that they gain, and the meaning of scientific ideas in society. AMNH courses are designed this way based on a certain set of assumptions, that is, the AMNH’s “theory of action” or logic model about how the SOS courses help strengthen science teaching.

A core assumption is that, as professionals, *teachers are capable of and motivated to continue learning science as adults*, and further, *teachers’ ongoing learning is important to their vitality and skill as teachers of science*. In other words, what teachers learn as adults about the content areas that they teach provides them with benefits in their role as educators.

A second assumption is that *teachers are able to apply what they learn in the courses to their own classroom teaching if their own learning opportunities are well designed and rich*. SOS courses are designed to give teachers hands-on experiences, access to authentic knowledge sources, multi-media materials, and regular opportunities to dialogue with the course scientists and other people taking the course. There is no “one-size-fits-all” way that teachers are supposed to apply what they learn to their teaching; rather, teachers are encouraged to use their new knowledge and the courses’ resources in ways that fit their specific teaching situations.

A third assumption is that when teachers enrich their classroom teaching, their students benefit directly and their schools and districts ultimately benefit, too. That is, SOS courses are intended *to help teachers enrich student learning of science* by adding to teachers’ content knowledge, introducing teachers to cutting edge science, and putting supplemental teaching materials into the hands of teachers. The courses also *add value to schools’ and districts’ efforts to strengthen standards-based science programs* by addressing key science standards, both conceptual standards and standards for scientific inquiry and practices.

This diagram represents the logic behind the design of SOS courses.

