

## Appendix I

### External Evaluation Plan for Educational Component of PBO Nucleus

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Scope of Work The external evaluator and project staff have discussed the evaluation priorities and strategies for evaluating different project components. The external evaluator will be responsible for the following activities:

- Work with project staff to develop overall evaluation plan, including components to be carried out by project and by external evaluator.
- Review and offer formative feedback on internal evaluation plans and instruments.
- Review and comment on internal evaluation findings and reports.
- Carry out two independent evaluation studies of longer-term impacts of the project:
  - Follow-up interview study of teacher learning and implementation outcomes of PBO modules following attendance at a project workshop;
  - Interview study of scientist involvement in the project and outcomes of their involvement.
- Prepare annual evaluation report for project leaders and NSF (prior to July annual report needs), including summary of evaluation plan and progress to date, reviewed internal evaluation plans and/or findings, and external evaluation findings, as appropriate at each project stage.
- Communicate with project staff as needed.

#### Studies to be Conducted

I. The *study of teacher learning and implementation plans* (teacher study) will address the following evaluation questions:

- How well did teachers understand workshop material?  
This self-report data will complement teacher assessment data gathered immediately following the workshops and will emphasize long-term retention of key ideas identified by the project staff as crucial learning goals, and relation of these ideas to teachers' previous knowledge.
- Which workshop materials did teachers use, to what extent, and how did they use them?  
If they did not use the workshop materials, why?  
This question addresses teachers' implementation of the materials, including the degree and extent of implementation, course timing and context, the decision-making process to implement or not, reports of evidence for student learning (complementing student learning data to be gathered by teachers and shared with project), plans to re-use, revise, or discard, and views of the materials, including suggestions for improvement.
- How did participating teachers benefit, and what costs (or failures to benefit as expected) did they incur from participating?  
This question addresses benefits to teachers' work, i.e. to their students in their

classrooms, and to themselves as individuals (including professional and affective benefits).

Data will be gathered via 20-25 short (30-minute) telephone interviews with middle and high school teachers participating in workshops. If this study is to be completed by the project end date of July 2008, the sample must be drawn from teachers participating in workshops held no later than summer 2007, so that sufficient time (4-9 months) is allowed to enable teachers to have a choice to use the materials at an appropriate place in their course curriculum and for the evaluation team to complete transcription, coding, and analysis of the interview data. The sample will be drawn to include variables such as workshop attended, grade level (middle/high), school contexts and student audiences, teacher science background and experience, and teacher gender and ethnicity if possible.

Information needs for sample & protocol development:

- workshop registration data – teacher names and contact info, grade level and science preparation, courses taught and basic school demographics.
- accurate list of workshop participants (if different from registration data)
- consent forms—best completed and sign at the workshop
- copies of post-workshop surveys (do not need to be matched by individual)
- copies of workshop schedules and materials

II. The *study of scientist involvement and outcomes* (scientist study) will address the following evaluation questions:

- What roles did scientists take in the project, with what motivations, and what did they accomplish through these roles?
- How did scientists benefit from participating, and what costs (or failures to benefit) did they incur?
- What are their views of educational outreach in connection with their research program, and how did they change over time during the project? (reported retrospectively)

In addition to providing useful data to the project about the extent and nature of scientists' contributions to the project, this study will aid future projects by providing information about the effectiveness of different roles for scientists in furthering the project and generating a culture of engagement of scientists in education.

Data will be gathered via 12-15 short (20-30 minute) telephone interviews with scientists identified by the project as participating in the project in various ways. Interviews will be conducted in winter 2007-08 in order to enable transcription, coding and analysis to be completed by the end of July 2008.

Needs for sample & protocol development:

- list of scientist participants and contact info, and verbal description from project staff of their roles.
- some awareness of scientist field schedules (if relevant) during 2008 so that interviews can be scheduled outside heavy work time.

Given the seniority of the interviewees, use of a graduate student interviewer in this study is not recommended.

Additional evaluation work is estimated at 15 days total (over 3 years), including planning and review work already completed; preparation of Human Subjects application, instrument review, conference calls and meetings and workshop observation.

#### Reporting and other Work Products

- Written progress reports on the evaluation work completed to date—data collection, analysis, and preliminary findings if appropriate—will be prepared in June annually, as input to the PIs' annual reporting needs to their funder.
- A written report of findings (or manuscript for submission for publication in an education journal, if appropriate) on each of the two studies will be presented in final form no later than September 2008.
- Oral reports to the EPO director, Susan Eriksson, or her designated substitute or group, will be made as requested. Draft findings from the two studies will be presented orally in July 2008.
- To protect subject confidentiality and maintain Human Subjects approval, data will be shared in analyzed, not raw, form. Consistent with E&ER's standard policy, the data and findings remain the intellectual property of E&ER.