Student-Teacher-Scientist Partnerships

Core Concepts:

- Students, teachers, rangers, and research scientists, working together in a Student-Teacher-Scientist Partnership, can gather exciting and beneficial data at MHS – more than scientists and students can gather alone.

- Middle level students can develop, ask, and answer their own questions about MHS. Some of the questions they ask may be ones scientists do not yet have answers for and others may help to support and reinforce current hypotheses and theories.

- Given the tools, background, and structure, students are capable of participating in cutting-edge science research on many levels.

What is a Student-Teacher-Scientist Partnership?

Student-Teacher-Scientist Partnerships (STSPs) are relationships formed between research scientists and school groups. The students, teachers, and scientists work together to answer real-world questions about a phenomenon or problem the scientist is studying (Tinker, 1997).

The STaRRS partnership was developed to be embedded within the existing E:Y! program, thus the curriculum and lessons outlined in this section are meant to supplement the E:Y! experience. They have been specifically developed for teachers who would like to enhance their students' science experiences within E:Y!. These lessons can add approximately two weeks of additional preparation time prior to the expedition, and another couple of weeks post expedition. Some of the teachers who have used them have found ways to: 1) spread the lessons out over several months, 2) incorporate pre- and post-STaRRS lessons into their existing curriculum, and 3) use the post expedition science experiences to fulfill the E:Y! requirement for community sharing.

There are three main components for the STaRRS Field Science portion of the curriculum – they are:

- Photo point data collection
- Grid (transect) protocols for active hot springs at MHS
- Student-driven Research Investigations

These three areas can be used separately or in conjunction with each other.

The extent to which you as a teacher, incorporate each of these areas into your E:Y! experience will be based on: 1) the abilities and needs of your students, 2) the alignment you are able to achieve between E:Y! STaRRS and your school/district's curriculum, 3) your own comfort level with the equipment (tools), procedures, and fieldwork. Rangers at E:Y! are familiar with the STaRRS field science, and will be able to help you in the field to identify the photo point (PP) locations and gather PP data, identify locations for grid protocols and provide time for data collection, and provide location and time for student investigations. However, they will not be able to do any preparation for your students at the expedition. You and your students will need to be prepared for the field science when you arrive at E:Y!. These lessons were developed to help you with that preparation.
Note: It is very important that you include STaRRS lessons in your pre-expedition communication with E:Y! rangers. This way they will be able to more easily plan for the scheduling differences that are required for a STaRRS expedition.

As much as anyone would wish, we cannot do it all. As you may know, from past expeditions, there are more E:Y! lessons and activities than any one group can do on an expedition. Preparing an itinerary for E:Y! requires picking and choosing. If you are interested in giving your students a taste of science how it is really done, this may be for you. It involves getting your students to do hands-on field science in a really exciting and dynamic system, while encouraging them to work past the data collection into the sharing and participating in science the way that their adult research science colleagues do.

You do not need to do all three STaRRS components at once, you may want to try to do one or two your first time out, and another the next time, and then a combination of two of the three in other years. The following diagram shows how each of the components are related and can be used to build upon each other. (Figure 1)
In terms of ease, collecting photo point data is the easiest, takes the least amount of time and is the easiest to integrate within the existing E:Y! program. The only special equipment requirements are the preparation lessons, use of a specific camera (the Nikon P60) which is available from the E:Y! rangers if you do not already own this specific camera. You are asked to also upload of the photos when you finish your expedition. Post expedition lessons will enhance your students’ experience with the understanding of how their data collection contributes to the whole picture.

Preparing for the Grid Protocols takes a significant amount of time. Students need to become familiar with the equipment and the protocols, and try them out ahead of time. Several practice sessions are best, with at least one of them outside. This component can be integrated into any science unit requiring the accurate and careful collection of data.

Student Driven Research is the most difficult component. If it is done completely, it can be used to fulfill curriculum requirements for students to participate in a full (guided) inquiry cycle within any science program. It includes the use of the tools*, understanding the basics of the system, the development of answerable questions, and analysis and presentation of their research.

*If students have already worked on learning the tools for the grid protocol data collection, this component gives them an opportunity to apply this knowledge.

**Will my students be able to handle this?**

Do not undersell your students’ abilities to conduct this type of research and make some very sophisticated connections about some seemingly simplistic questions. (See list of questions from previous student research at the end of Student Driven Research lesson) Recall that answers to really big questions—such as: “What are the causes of global climate change?” are made up of answers to many, many smaller, simpler questions. And when people (including your students) are truly interested in discovering the answer to a question, motivation will create a springboard for dealing with intellectual challenges not normally seen with seemingly unrelated knowledge acquisition. An example: One of the first STaRRS groups was a class of 5th grade students from a rural school. By all accounts, this was the lowest (academically) group to have come through the school in a number of years and there was a lot of skepticism from the school administrators of the students’ ability to handle the project. Not only did the entire group participate fully in all aspects of the STaRRS curriculum, they actually produced products from their experiences that demonstrated full understanding of their tools, their questions, and their investigations, their analyses and their results. They also demonstrated a secure grasp of connections to further research for themselves and the broader scientific community. These students presented their research to four different audiences. They were just as enthusiastic six months after being in the field as they were the first time they presented it, just after returning from gathering data in the field. A science fair judge comments on one of the group poster sessions he judged at the fair saying, “What I love about these kids is that they ‘own’ the knowledge.” They were not just parroting facts, they were thinking and explaining all parts of the scientific process.

**References**

Student Experience BACKGROUND: Student-Teacher-Scientist Partnerships

EXPEDITION: YELLOWSTONE! STaRRS