

Immersing Teachers and Students in Research-Based Science

This partnership will involve collaboration between five schools: Belmont Elementary, Canterbury Elementary, Great Brook School, Rochester Middle School, and Boynton Middle School, and the UNH GLOBE Land Cover/Biology Team and the GLOBE at the University of New Hampshire – Land Cover/Biology Team Partnership (hereafter referred to as the UNH GLOBE Partnership). The purpose of this project is to train teachers in these five schools in the GLOBE protocols and in the supporting background science to enable teachers to integrate the protocols and the content into their curriculum. This partnership aims to use GLOBE to encourage more student research-based science. In addition, the partnership will increase content knowledge in the GLOBE investigation areas of Atmosphere, Earth as a System, Hydrology, Land Cover and Soil.

After the initial training, the teachers will be supported on a monthly basis with a GLOBE email newsletter, and every month, there will be a visit by a member of the UNH GLOBE Partnership or a scientist relevant to the material being implemented. During and after the grant period, there will be other opportunities for professional development such as additional workshops and visits, and email and telephone support, thereby maintaining the continued support in science. When appropriate, teachers will train at or visit sites and facilities that are relevant to their curriculum area. An effort will also be made to use distance learning to support the teachers with opportunities to share what they have learned while implementing GLOBE; i.e. what works well, what has not worked well and any projects they are in the process of carrying out.

The GLOBE protocols were designed and are used by GLOBE scientists to carry out their own research. These protocols have met rigorous standards and will be correlated to the NH Frameworks once the frameworks are finalized. Since GLOBE protocols were designed by scientists, they provide the tested and valid methods and procedures for data collection. The GLOBE Teacher's Guide and supplemental materials guide teachers in what questions to ask before starting data collections and how to foster inquiry for each investigation area. The GLOBE website provides a forum for students to submit the results of their research. The GLOBE data collection process involves the use of probeware, data entry using the Internet, digital graphing and mapmaking, GIS and digital image processing (using satellite imagery). There is a strong technology piece to the grant project that is already inherent in GLOBE. The GLOBE Program, its methods and processes are science. GLOBE is not a curriculum; rather, it is made up of the content background, methods and shared data that students can use to become a scientist themselves.

This project offers the most effective and sustainable way to implement GLOBE – across multiple grade levels and subjects so that as the students move up in grade level, they deepen their learning and carry out the more complicated or involved protocols. They can also spend more time on data analysis and consider what the data mean. For maximum sustainability and incorporation into the science curriculum, there should be a number of GLOBE teachers at one school. While each teacher may choose the protocols and content that fits their interests and curriculum, as a group, they create a GLOBE School Study Site with data collected on the atmosphere, earth as a system protocols, hydrology, land cover and soil of the community. They collaborate and support one another by sharing these data and their students' research. Over the grant period of 18 months, students can collect a considerable amount of data and at the end, have a snapshot of how their school site changes over time and answer inquiry questions they design before or as they collect data. As these schools continue their GLOBE data collection over a period of years, they can begin to study more trends and explore more questions about their school site and what is taking place in their community in more

detail. As the school curriculum changes, the inquiry questions that they post to guide research design will also change. In this GLOBE training proposal, the emphasis will be on teacher networking and fostering confidence in their data collection techniques and subject area content so that once this grant period is over, the GLOBE trained teachers will provide support to each other. This project also is aimed at fostering sustainability of GLOBE within the school by supporting the training of several teachers at GLOBE Headquarters Train the Trainer workshops and paying for teacher participation in graduate level content area courses. Once trained and with such a large base of proficient teachers, these schools will be able to train new teachers in GLOBE protocols and model for them how to incorporate more authentic science and inquiry based-learning into their course content. The success of GLOBE in each of these schools is dependent on this ongoing, sustained professional development related to GLOBE implementation.