

## **P1.20 EDUCATIONAL OPPORTUNITIES IN WEATHER AND CLIMATE FOR NJ CLASSROOMS**

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### **1. INTRODUCTION**

The Office of the New Jersey State Climatologist (ONJSC) at Rutgers University is developing a working model for a statewide educational outreach program for New Jersey schools as a founding member of the Plainfield, New Jersey school district's Science and Technology Advisory Committee (STAC). STAC was formed in Jan 2001 to build avenues of communication among Plainfield schools and professionals at local universities and industries related to the fields of Science, Technology, Engineering, and Mathematics (STEM).

The goal of STAC is to develop the educational tools and professional opportunities necessary to improve the overall achievement of traditionally underrepresented groups in the STEM fields. The Light and Life Laboratory and the Davidson Laboratory at Stevens Institute of Technology (SIT), another founding member of STAC, have already collaborated with the ONJSC to guide two Plainfield High School students through research projects in spring 2001. The ONJSC plays a multi-faceted role within STAC, as a provider of research opportunities, real-time and archived NJ weather and climate data, and for specialized training and support for Plainfield educators utilizing weather data in the classroom. All six Plainfield High School Earth Science educators participated in a preliminary, five-hour training workshop designed and implemented by the ONJSC on 12 May 2001. The specialized training will be discussed, as well as the progress of STAC towards the creation of a statewide model for local weather education for New Jersey educators and their students.

### **2. WEATHER INFORMATION ACCESS**

New Jersey is geographically, economically and culturally diverse. A New Jersey Earth Science educator's need for localized knowledge of weather and climate can range from the snowy, hilly terrain of Sussex County in the north to the urban heat islands around cities to the maritime

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coastal areas of Cape May County in the south.

The ONJSC at Rutgers University has actively developed a network of existing and new environmental monitoring stations in every county of the State called the New Jersey Weather and Climate Network, or NJ WxNet. The NJ WxNet serves as a centralized, online source for real-time New Jersey weather and climate information ranging from data tables to animated, color-filled maps. The NJ WxNet furthers the ONJSC's three-fold mission of providing citizens with NJ weather and climate data, research, and education. (Robinson, 2002) The ONJSC has designed the NJ WxNet for use in the classroom to provide Earth Science educators with a key resource for real-time NJ weather and climate information. Numerous studies have shown the significance of using technology to relate scientific concepts to real-world applications. (Duvall and Holzer, 2001) NJ WxNet data available via the World Wide Web can allow students to see scientific concepts in action through the occurrence of weather phenomena. Mobile weather stations from SIT's Davidson Lab have already been utilized for research conducted by Plainfield HS students in spring 2001. The ONJSC and the Davidson Lab plan to integrate mobile weather station data with the NJ WxNet.

### **3. EDUCATOR TRAINING**

Providing weather and climate data for Earth Science educators is only the first step toward fulfilling the ONJSC mission of data, research, and education. New Jersey's Earth Science educators are not required to have had classes in the fields of Earth Science. Therefore, New Jersey educators may not necessarily have the knowledge base to conduct advanced explorations and discussions using online weather and climate data. Existing national programs designed to aid Earth Science educators such as GLOBE, WES and Datastreme cannot feasibly be tailored for every municipality of the United States, nor can they reach out to the hundreds of Earth Science educators at New Jersey's high schools much less the elementary and middle school educators within a reasonable timeframe without expanding current levels of operation by several orders of magnitude. More localized training programs uniquely designed to support area educators are required to aid Earth

Science educators with the challenge of immersing their students in local weather and climate.

The ONJSC is responsible for training and supporting the Earth Science educators of the Plainfield School District through STAC. The authors designed and implemented a preliminary, five-hour training workshop on 12 May 2001 that was funded by the SIT Light and Life Laboratory, another founding member of STAC. Dr. Robinson conducted the first session of the workshop. He provided an overview of New Jersey's climate and the role of anthropogenic changes, geography, and long-term patterns in determining the climate of the state, followed by a lively discussion of extremes and landmark events. Ms. Holzer conducted the second session of the workshop. An Earth Science educator at Chatham, NJ High School, Ms. Holzer presented an Earth Science educator's perspective of how to employ ONJSC and other resources in the classroom in compliance with state and national standards. A rugged thermistor was demonstrated as an example of the type of affordable, "real-world" instrumentation that could be operated by students for comparison with official data from the area. Mr. Duvall conducted the final session of the workshop off of a CD-ROM created and distributed specifically for the workshop participants. Basic weather concepts were reviewed and enforced through case study data on the CD and an inquiry-based demonstration.

#### **4. SURVEY AND OBSERVATIONS**

All sessions were designed to offer the participants a glimpse of what a more thorough, week-long workshop would entail. A post-workshop survey was distributed. The survey provided helpful comments and feedback regarding the structure and execution of future workshops for Earth Science educators. It is recognized that six educators from the same school do not create a representative sample of all New Jersey Earth Science educators. However the goal of the preliminary workshop was to create an educational opportunity for specialized weather and climate instruction specific to a given location within the State. Survey comments were particularly insightful. One participant wrote, "I currently teach Physical Earth Science to Latino students. The weather is an intricate part of Latinos adjusting to the USA; therefore these workshops will not only create an awareness to monolingual students but also to students who come from other climates."

One key advantage for New Jersey Earth Science educators is the diversity of the State's climate. A student from a climatologically snowy region could relate to the Blizzard of 1996 just as another student from the tropics could relate to Hurricane Floyd. Another participant stated that New Jersey's weather and climate should be observed and archived for classroom use throughout the State, all year, "since NJ has such vast differences in weather regions."

#### **5. CONCLUSION**

State-specific educational outreach programs centered around statewide weather networks are necessary to broaden the dissemination of our collective knowledge of the weather to all Earth Science educators. STAC was developed since early 2001 to provide additional opportunities in science and mathematics for traditionally underrepresented populations residing in Plainfield, New Jersey. The goal of STAC is to conduct a successful, collaborative effort among Plainfield K-12 educators and students, university scientists, and local employers that would increase the number of successful transitions from K-12 to college to the local workforce and also provide a working model for other school districts.

#### **6. ACKNOWLEDGEMENTS**

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