GLOBE Program Implementation

at

Norfork School

as of

15 December 1999

UNDIQUE

VENIMUS

An update briefing to the Norfork School Board

What is the GLOBE Program?

The Global Learning and Observations to Benefit the Environment Program involves our students measuring, learning, and investigating their local environment. GLOBE is a cross-cirriculum tool that incorporates almost all disciplines, throughout our school system, and integrates the use of available technology into our student's hands. Its applications apply primarily to mathematics, social studies, and the sciences. While initially focused upon the elementary grades, intermediate and advanced protocols allow its application to be adjusted to its audience. In fact, the primary beneficiary of the program's data is environmental researchers at the post graduate level.

The GLOBE Program web site at www.globe.gov can offer a thorough explanation of the overall program.

How did we (at Norfork School) get involved?

Last spring, Wade Geery and Kevin Bodenhammer applied to attend a summer GLOBE Teacher's Workshop at the Fayetteville campus of the University of Arkansas. Each was accepted and attended during the period of 11 - 15 July 1999.

During the workshop, these two teachers became certified in the implementation of the program and how to conduct the various scientific protocols. The GLOBE equipment was issued to our school and upon our return this fall, it was set up and tested. Geographic coordinates (using Global Positioning Satellite equipment) were measured for the school weather station, three hydrology sites, and two soil investigating sites. This set the stage for student involvement.

Elementary students have been measuring and reporting atmospheric data since school started this fall. The school's GT coordinator has expressed a desire to involve our high school students in data collection and our vocational agriculture (environmental science) program is conducting a parallel set of measurements that can incorporated into GLOBE Program data.

What do our student's do with the GLOBE Program?

On a daily basis our elementary students measure a variety of atmospheric data and report their observations over the internet to a GLOBE data server. Measurements include time, cloud cover and type, precipitation, and recorded temperatures. If rainfall was recorded, rainfall pH is measured. Weekly students measure and report soil temperature at 5 and 10 cm depths around our weather station.

On a monthly basis, hydrology data is measured from Lake Norfork, the Norfork River, and the White River. These data reported include time, water temperature, pH, dissolved oxygen levels, conductivity, alkalinity, other metadata such as the lake level and the number of generators on line that may influence the measured readings.

On a continuing basis, various soil measurements are conducted such as core sampling using a soil auger, soil moisture, density, pH, texture, composition, color, fertility, and character by particle size distribution. Over time, the soil moisture data may prove to be the most beneficial measurements made since these data are the most difficult to replicate at the researcher level.

After entering data into the GLOBE data server, students can produce time series graphs comparing our data to other GLOBE schools reporting worldwide. By accessing the "visualizations" side bar at the GLOBE web site and searching for Norfork school, you can view up to any six user selected criteria, simultaneously.

What's in the future?

Next year, we hope to include biometrics, the measurement of plant and animal populations, to the list of GLOBE data measurements. Using such measurements made from a variety of plant species at various locations, we can validate pixel data from LANDSAT photography.

Eventually, we hope to be able to teach students how to create their own maps using Geographic Information System (GIS) software and local coordinate information. In this manner, the GLOBE Program can be incorporated into non-scientific fields such as social studies, land use planning, forestry inventory, agriculture, and business management.

GLOBE is hands-on. After the initial instruction, teachers are free to monitor and adjust program activities as time and various curricula allow.

What is the trade-off?

What is instruction or class time is sacrificed for the GLOBE Program?

Nothing. GLOBE provides the equipment and methodology to allow us to meet and exceed our state mandated frameworks (Student Learning Objectives) from our local environment, not just a textbook. Students relate to the here and now, not just what the book tells them.

EXTRACT from Arkansas Science Frameworks, Grades 5-8, revised 1999:

Strand 1: Physical Systems, Content Standard 1-3

PS.1.4. Students must be able to interpret scientific information from graphs and charts.
PS.3.1. Students must be able to design and conduct scientific investigations to answer questions.

Strand 2: Life Science Systems, Content Standard 1-3

LS.1.2. Students must be able to interpret scientific information from graphs and charts.
LS.1.4. Generate conclusions based upon evidence acquired through experimentation.
LS.2.12. Evaluate human impact upon the environment.
LS.3.2. Correlate life science activities to other curricular areas (i.e. language, math, social studies).

Strand 3: Earth/Space Systems, Content Standard 1-3

ES.1.1. Identify the components of Earth and their properties.
ES.1.4. Students must be able to interpret scientific information from graphs and charts.
ES.1.5. Identify and classify rocks and minerals.
ES.2.4. Understand the effects of weathering and erosion on the Earth's surface.
ES.2.6 Describe the energy transfer within the atmosphere as it relates to weather and climate patterns.
ES.3.1. Students must be able to design and conduct scientific investigations to answer questions.
ES.3.3. Students must be able to use appropriate equipment, tools, techniques, technology, math, and technical writing in scientific investigations.
ES.3.5. Construct models of earth science systems and make real world applications.
ES.3.6. Analyze the impact of human activities on the Earth's crust, hydrosphere, atmosphere, and biosphere and demonstrate methods of conservation and recycling of the Earth's resources.
ES.3.8. Illustrate the positive and negative effects of human use of natural resources on Earth.
ES.3.9. Measure weather conditions using appropriate equipment.

Who else is doing the GLOBE Program?

Over 3000 schools within the United States and almost a thousand schools in about 70 countries world-wide participate in the GLOBE Program.

Ninety one schools throughout Arkansas are participating in the GLOBE Program, most located near the academic and population centers within the state.

We are the first school in our part of the state (within 50 miles) to participate.

We are the first school within our Educational Service Cooperative to participate.

We are the first school within Baxter County to participate.

Invitation to Visit with our students!!

I want to take this opportunity to invite each and all of you
to visit Mr. Geery's elementary science classroom
and discuss with our students
what they are doing with their GLOBE Program.

Let them show you how they are collecting data.

Let them tell you how excited they are to be doing
the experimenting and measuring.

See for yourself how GLOBE data collecting
is helping educate our youth.

UNDIQUE

VENIMUS

"First of its kind"