Workshop activities stress knowledge, aesthetics and preservation with these objectives:

- to gain the students’ attention with respect to the beauty of nature and its fragility and to encourage students to protect and preserve our ground water;
- to construct researchable questions and hypotheses;
- to provide techniques to delineate a procedure to collect data for results and conclusions.

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Chipola College was invited to host a workshop for the Panhandle Area Educational Consortium (PAEC) during the summer of 2008, funded by the PAEC grant Sc:iii (Science Collaboration Immersion Inquiry Innovation). Brenda Crouch, PAEC consultant, and Dr. Lou Cleveland, Chipola’s Director of Education, asked a group of five professors in the science department to research with educators (graduate students) who are teaching science in Grades 3-12 in participating school districts.

Five teachers from a pool of 120 selected Chipola College as their summer work site from a possible 40 sites. The following area teachers participated: Rachel Belser, Holmes County High School; Becky Collins, Graceville Elementary School; Priscilla Comerford, Riverside Elementary School; Kenny Hamilton, Marianna Middle School; Caron Harris, Graceville Elementary School.

The area teachers worked with Chipola professors Allan Tidwell; Santine Cuccio; June Mays; David Hilton and Virginia Baker in the professors’ respective science disciplines, with the assistance of the Ground Water Outreach Project team. One common focus for the various activities was related to the knowledge, aesthetics, and preservation theme of the DEP-funded Ground Water Outreach Project grant.

Read more about the activities and adventures on the following pages.
Science Disciplines Unite for PAEC Workshop

According to Patrick L. McDaniel, interim executive director of PAEC, and Florida State University instructors Penny Gilmer, Steve Blumsack, and Donald Bratton (Florida State University graduate course CHM 5830), the purpose for this scientific research course is to provide authentic research experiences for practicing Grades 3-12 teachers so that they can teach science to their own students using inquiry.

For two hours of credit, the teachers spent approximately 90 hours planning for the research (including library research), executing experiments, writing personal reflections, and analyzing and summarizing results. Their collaborative work was represented in a poster session with other teams from various sites in the Panhandle.

Each of the five teachers was jointly supervised by science professors, teacher/grad student mentor, and Dr. Blumsack or Dr. Gilmer. The agendas of the five Chipola College professors were nested within their disciplines as shown here:

- Geology
- Microbiology
- Anatomy and Physiology
- Conservation Biology
- Molecular Biology

The area teachers (referred to as “the PAEC students” throughout this edition) were encouraged from the first day to construct a researchable question, which would be answered using techniques, knowledge, field trips, laboratory activities, research, and guest speakers.

The combined activities can be considered a unit plan for which the purpose is three-fold:

- to gain the students’ attention with respect to the beauty of nature and its fragility and to encourage students to protect and preserve our ground water;
- to construct researchable questions and hypotheses;
- to provide techniques to delineate a procedure to collect data for results and conclusions.
PAEC Students Explore Blue Spring Park

PAEC students met Jackson County Park Director Chuck Hatcher at the Blue Spring Park dock and learned that, in addition to swimming and boating, the park offers 168 acres of nature trail. Jackson Blue Spring is a first magnitude spring, meaning it can pump up to 122 million gallons per day -- one of 33 first magnitude springs in Florida.

The park is well attended in June, July and August, with about 26,000 visitors. In addition to those visitors, the park is used by Florida State University's forensics classes and by Texas A&M's cave diving classes.

The main highlights of the short canoe trips were the three special springs -- Hole in the Wall, Shangri-La, and Twin Caves -- and the caves. Twin Caves is spectacular from the point of view of peer-ing into the opening while looking straight down into the clear blue water. On this day there were bubbles from divers.

Hole in the Wall was accessible to students as they left the canoe to peek inside its cave. One of the students commented that the cave has a distinct prehistoric look.

Several feet from the shore there is a magnificent vent, as blue and crystal clear as Twin Caves. The biggest treat was Shangri-La Spring, where the students and professors were able to climb the 40 foot limestone cliff. One could see clearly the vent of the spring. Also from this altitude, the students could see the Officers Club, which is surrounded by lush vegetation. A remnant from World War II, the Officers Club is being considered for renovation as a public facility.

On the canoe trip back to the dock, Professor June Mays commented that the Blue Spring reservoir was much smaller until a dam was built in the 1920s. The dam enlarged the reservoir and created Merritt’s Mill Pond.

Discover Florida's springs for yourself. Visit www.floridasprings.org for more information and educational resources. Read more about our previous adventures at Blue Spring on Page 10 of the May 17, 2008 issue.

PAEC Students Inspect Landfill

The main question for Achaya Kelapanda, District Manager of the Springhill Regional Landfill in Campbellton (owned and operated by Waste Management, Inc.) was: How does the landfill deter ground water contamination?

Kelapanda, who has worked at the landfill for 14 years and has an engineering background, explained that the process begins with the preparation of the 840-acre site for the reception of refuse. The land is measured into 10-acre cells and sloped toward the middle for waste placement. A more detailed description of the landfill is available in the newsletter dated August 13, 2007, Page 4.

A nuclear density gauge is used to assess permeability. The waste is sifted for sharp edges and garden clippings, etc., which are treated separately to insure ample space.

The life of the landfill is about 47 years, and it takes about 30 years for the waste to decompose.

Monitoring wells are placed to test for metals and volatile compounds; and detection wells are used to identify contamination. Probes are used to detect gas migration.

Kelapanda led the PAEC members on a tour of the wetlands. From the 162-foot elevation of the landfill, one can appreciate the wetlands, boardwalk, and diverse plant life -- pines, palms, magnolias, crepe myrtles, and roses.
PAEC Students Investigate at Wastewater Facility

The PAEC students visited the Marianna Water and Wastewater Facility in order to better understand the water purification process with respect to ground water protection and to experience the microbiological analysis of wastewater samples taken at various points of the facility.

Tour guide and maintenance supervisor David Melvin assisted PAEC students in their collection of data and in building their history of wastewater purification. The two-hour visit began with a question and answer session. The students were interested in testing water for contamination and in exploring the lab. Melvin explained that there are 16 monitoring wells, and that tests performed include: biologic oxygen demand (BOD), nitrogen, ammonia, arsenic, dissolved oxygen, chlorine, cadmium, chromium, lead, fecal coliforms, pH, and turbidity.

Students asked about the stresses of the closed rendering plant, which was located next to the wastewater facility 30 years ago. Melvin explained that there is 16 monitoring wells, and that tests performed include: biologic oxygen demand (BOD), nitrogen, ammonia, arsenic, dissolved oxygen, chlorine, cadmium, chromium, lead, fecal coliforms, pH, and turbidity.

Students asked about the stresses of the closed rendering plant, which was located next to the wastewater facility 30 years ago. Melvin explained that the disposal of blood and animal carcasses did cause problems for the facility at that time, but it is no longer an environmental issue. That occurrence has become a valuable learning experience.

Melvin spoke of the difference in the two types of treatments -- one is for Class A (sludge), which is sent to the landfill, and the other is for Class B, which requires further purification. It takes approximately 30 to 60 days to age sludge. Sedimentation rates are monitored; sludge that settles faster is better.

In regard to solids testing, higher concentration means more stability. The second treatment is for the water through chlorination and the addition of microbes.

The group toured the mechanical removal site and then the aerator, where the organic breakdown of two million gallons of raw sewage begins each day. The mixer treats the anaerobes; the splitter clarifier at the next site returns activated sludge to a prior site to expose sludge to fresh microbes. The chlorine contact chamber disinfects. Another site pumps (or digests) the sludge, which can be black (indicating anaerobes) or brown (indicating aerobes).

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Outreach Team and DEP Share Information

The Ground Water Outreach Project team was invited by James Dodson of the Florida DEP Ground Water Protection Section to introduce Chipola College and its ground water curriculum to the DEP staff on July 11. The team traveled to Tallahassee to deliver a presentation that explained the project’s educational objectives and outreach themes:

- Education - Data Collection - Conservation
- Science - Technology - Society

Future endeavors were also discussed with the group, and the attendees were provided a summary of the lab activities commonly used during the area school events.

Preceding Chipola’s presentation, Greg Ira, DEP’s Director of Environmental Education, commented on the distinction between outreach and education. Outreach is thematic, consisting of slogans or prohibitions of pollutants. Education facilitates a change in behavior; it is formal instruction.

Following the presentation, the Chipola visitors were introduced to Russ Frydenborg (Environmental Administrator of the Environmental Assessment Section, Bureau of Standard and Special Projects), who delivered a PowerPoint presentation entitled “Introduction to Water Quality and Sampling.”

Frydenborg then led a tour of the facilities where DEP employees analyze 5,000 water samples per week. The samples are collected within a 100-mile radius. Since there is a short holding time (especially for bacteria, 8 hours) there are smaller labs positioned throughout the state that analyze 20 to 50 samples per week.

Frydenborg explained that the biggest problem is not from point source pollution but is in fact nonpoint source pollution whose source is unknown. The labs test air and soil and analyze liquid and water for biological, organic and inorganic contamination. The numbers of microbes, such as algae, Klebsiella, fecal coliforms, are ascertained. Other tests performed are for: toxicity; chlorophyll; algal growth; and BOD (biologic oxygen demand), which is the amount of oxygen consumed by microbes when they process animal waste.

The lab taxonomist identifies microbes to the level of genus and species. Organic analysis consists of chromatography for oil and grease, phenol, PAH, and pesticides such as organophosphates, malathion, chlorination. Frydenborg explained that quantities are measured in ppm (parts per million), and an analogy of this measurement would be one minute in two years or one inch in 16 miles.

Inorganic analysis is through spectros-copy specifically for heavy metals (such as mercury), which can be magnified 10 to the 7th or 8th power. Other tests include hardness (a measure of toxicity), turbidity (clogs gills and obstructs light), and specific conduction (a measure of how soft or salty the water).

Frydenborg stressed the importance of standard operating procedures (SOP). Also stressed was quality control, precision and accuracy.

Read more about nonpoint source pollution (NPS), the pollutants involved and the effects of those pollutants on our waters on the EPA website.
Ground Water Team Visits Roulhac ESE

Roulhac Middle School ESE teachers Kathy Nelson and Liz Nelson first attended a workshop at Chipola College on April 18, 2008, to learn about implementing the subject of ground water into their curriculum. The teachers collaborated with math and science student teachers for the purpose of using ground water labs for their ESE classes.

The presentation outline was three-fold. First, the teachers will work directly with the ESE students in the classroom, enabling them to analyze soil type with respect to particles and percolation rates; to measure water quality; and to demonstrate the relationship between the water cycle and ground water. Second, ESE students will teach other middle school students the activities. Third, the ESE students will construct their own researchable questions and use the ground water strategies to answer them.

On May 23, the consultation came to fruition as forty middle school students moved through four ground water learning stations in one large lab at Roulhac Middle School. The students were divided into groups of four, and each group worked with each Ground Water team member for approximately 35 minutes.

The ESE (exceptional student education) students became familiar with principles of water conservation and contamination. Roulhac teachers Kathy Nelson and Liz Nelson and Ground Water team member Debbie Yglesias organized this successful day just a week before the end of the semester.

This was the first time that Chipola College’s Ground Water team worked with ESE students, and the level of enthusiasm and the questions were evidence that learning about geology and ground water was taking place on that day.

Reading specialists observed the unit plan in action to examine its potential for accommodating reading strategies. The next step would be to guide the students as they work individually and in teams on the activities so that they may instruct other students.
Approximately forty-five area high school students, who aspire to become teachers, assembled at Chipola College on May 21 for a teacher outreach program. Under a Florida Succeed Grant, Chipola College developed the program and launched it during the spring semester of 2008.

The Teacher Outreach Program targeted seven district high schools and identified students in those schools who are interested in a career in education. The selected schools organized their own Future Educators clubs under the direction of Teacher Outreach Coordinator Joan Lasseter. Chipola College Teacher Education students and members of the college’s Future Educators Club (FEC), moderated by Dr. Cherry Ward, met with the high school clubs throughout the semester.

The event brought area students together for an afternoon of educational activities. High schools participating included Bethlehem, Cottondale, Graceville, Holmes County, Malone, and Marianna. Joining the students were school sponsors David Williams of Bethlehem; Medea Callahan of Holmes County; Liz Sims of Malone; and Bridget Miller of Marianna.

Activities began with a welcome from Chipola College Executive Vice President Dr. Sarah Clemmons and Vice President Dr. Kitty Myers. Both Dr. Clemmons and Dr. Myers have been instrumental in the development of baccalaureate degree programs on the college campus and were delighted to host future teacher education students.

After the opening session, Chipola’s FEC students led the high school students through various activities, guided by teacher education faculty Dr. Rose Cavin, Dr. Santine Cuccio, Dr. Gina McAllister, and Dr. Cherry Ward. The high school students previewed education classes, received a tour of the education department, practiced leadership, learning and instructional strategies, and microbiology.

While becoming acquainted with microbial structure and techniques, the students were directed in the urgency of proper disposal of lab waste for the safety of drinking water. They received the Ground Water Outreach Project mascot, TAPP the duck, and a reusable water bottle to remind them to “think about personal pollution” and to “reduce, reuse and recycle.”
On display during the month of October was the environmentally-conscious artwork of Altha fifth graders Hunter Chason, Klara Carrillo and Kayla Bristow. Under the direction of their teacher Miranda Rehberg, the students attended labs and activities presented by the Ground Water Outreach Project team earlier this year and produced the winning poster design. This poster is the second one selected from the 20 that were submitted this year from the participating schools. The contest was sponsored by Chipola College and funded by the Florida DEP. This poster has been translated into a billboard that was located on Hwy. 90 in Marianna near the KFC and Jim’s Buffet restaurants. During the month of August, another billboard was presented in that area -- the work of Malone seventh graders. See that billboard on Page 5 of this issue.

Don't be mean keep our water clean!!!

Sometimes it can really hurt

Please stop polluting

Paid for by the Chipola College Ground Water Outreach Program.

Contacts for Water Quality and Septic Tank Issues

Calhoun County Health Department 850-674-5645
Holmes County Health Department 850-547-8500
Jackson County Health Department 850-482-9227
Liberty County Health Department 850-643-2415
Washington County Health Department 850-638-6260

Five District School Partners

Calhoun County
Bonnie Fagen, Miranda Rehberg, Shannon Romer, Sally Sims

Holmes County
Janice Andrews, Dawn Barone, Stephanie Pippin

Jackson County
Rebecca Beasley, Amanda Bloomer, Karen Pannell, Paulat Wright, Betty Taylor, Dean Ward, Diane Miles, Liz Sims, Kim Barber, Preston Roberts, Tammy Yates

Liberty County

Washington County
Greta Draayom, Cindy Padgett, Caren Prichard, Jackie Stokes-Taylor

Other Partners
Greg Ira - Florida Department of Environmental Protection, Learning In Florida’s Environment (LIFE) Program, 850-245-2132
James Dodson - Florida DEP Ground Water Protection Section, 850-245-8230