



"PBL ODYSSEY"

Bowling Green Junior High – Pamela Day, language arts; Melanie Ferguson, science; George Nagy, social studies; Betsy Nietz, intervention specialist; Student Teacher Erin Gilbert, social studies

The students at Bowling Green Junior High decided to focus on air quality in the junior high building for their local EXCITE project. All of the students were very enthusiastic about conducting a survey of the school. There were plenty of things to be found, including cockroaches!

- What legislation is in place regarding indoor air quality?
- How should a building survey be conducted?
- What resources are available for indoor air quality and are those resources reliable?

While the students were able to identify a myriad of potential problems, they learned that their general investigations could not accurately pinpoint a definitive source of the problems within the school. However, the students were able to come up with several realistic ways to prevent indoor air quality problems in the existing school and to propose preventative measures for a new junior high school that will be built in the near future.

During this school year, the participating teachers will have their students present their plans to the Parent Teacher Organization and the Board of Education. This year, the entire school building participated in the Project EXCITE Indoor Air investigation. Way to go BGJHS! ✂

Bowling Green Junior High students hard at work with language arts teacher Pam Day.

Topics for Investigation:

- What are the possible contaminants in the air and how can they be tested?
- What are potential health effects associated with the contaminants?

"IS THE SCHOOL BUILDING MAKING US SICK?"

Gateway Middle School – Amy Boros, science; Matt Smaltz, social studies; Amy Stough, language arts / reading; Marcia Wolford, language arts / reading / gifted and talented

The Gateway team decided to look at the middle school building to see if it was making its occupants sick. Team Apollo, consisting of 180-7th graders, participated in the investigation.

The Gateway Investigations:

- Conducting a building survey that focused on looking for areas of water damage
- Sampling the building water supply
- Performing an inspection of the building ventilation system by taking apart the room ventilators, checking the carbon dioxide levels in the building, checking the temperature and relative humidity throughout the building, and doing a bioaerosol study.

- The carbon dioxide levels in the rooms were too high, probably due to the fact they were not getting enough fresh air supplied to the rooms.
- The temperature and relative humidity were both found to be fine.
- Several types of mold and bacteria showed up in the bioaerosol study.

Based on their investigation, the students came up with recommendations for changes. They recommended that the room ventilator filters be changed once a season rather than once a year and a new, pitched roof replace the old roof that is flat and leaky. Their recommendations were presented to the district principals and then to the school board. An iMovie was created to document the entire experience. ✂

Findings from Investigation:

- Numerous water-damaged areas were found.
- Some water damaged areas were beginning to grow mold.
- The samples of the building water supply were found to be in compliance with the EPA's recommended levels.
- The room ventilators were found to have extremely dirty filters.



Gateway Middle School students present their findings at the Research Colloquium in May, 2002.

STUDENTS IN THE KNOW...

The Second Annual Environmental Science Colloquium - COSI Toledo, May 28th, 2003.

EXCITE students and teachers from Northern Ohio will make presentations at COSI Toledo on May 28th, 2003 from 4:30 - 8:30 pm. The poster or multimedia presentations will highlight findings from the local EHS

investigations. This year's participants include, EXCITE students representing Anthony Wayne Middle School, Bowling Green Junior High School, Rossford Junior High School, Youngstown City Schools, Springfield Middle School, and Gateway Middle School of Maumee. The Colloquium is also open to any K-16 student team that would like to present their findings from an environmental science investigation. The event is also open to school administrators, parents and other school community members. Last year, over 200 students participated and gave highly impressive presentations of their work. If you would like to have your students present at this event, please contact Amy Boros at the Project EXCITE office prior to May 1st, 2003. ✂

Exciting Numbers

- Number of Schools – 6
- Number of Teachers – 24
- Number of Student Teachers – 6
- Number of Professional Development Hours per Teacher = 180+
- Number of Students Experiencing Local PBL units – 1,650
- Number of Students Experience ZoOdyssey – 2,000
- Number of Items in EXCITE Loaning Library – 300

FEATURED IN THE UPCOMING ISSUE:

- FIELD REPORTS
"Urbanization" by Springfield Middle School
"School makes me Sick, literally!" by Youngstown
- EHS CAREER OPPORTUNITIES
- FOCUS ON FOOD-BORNE ILLNESS: E. COLI
- MEET A EHS SCIENTIST
- UPCOMING EVENTS

Website Highlight

www.epa.gov/enviro/wmc/

"Window To My Environment" is a new web-based tool that provides a wide range of federal, state, and local information about environmental conditions and features in an area of your choice. This application is provided by U.S. EPA in partnership with federal, state and local government and other organizations.

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Environmental health science eXplorations through Cross-disciplinary & Investigative Team Experiences

WHY DO I HAVE TO LEARN THIS?

By Amy Boros, Program Manager

In classrooms all across America, the common phrase "Why do I have to learn this?" can be heard day after day. Too often in more traditional textbook-based and content-driven courses, the connection between the subject matter and the real world is seemingly lost. Organizing learning around interesting and current topics can help students better understand the relevance of an activity or lesson. So how can we motivate students to actively participate in school and the world around them, while at the same time answer the time honored question, "why do I have to learn this?"

One answer is found in Environmental Health Science (EHS). EHS focuses on how humans interact with and change their surrounding environment and as a result, potentially impair their own health. People are naturally concerned with their health so EHS issues are logical starting points to launch learning. EHS is inherently interdisciplinary, bridging the sciences, social sciences, and supporting disciplines such as math and language arts.

In a recent survey of schools conducted by the State Education and Environment Roundtable (SEER), it was found that using the environment as an integrating theme "significantly improves student performance in reading, writing, math, science and social studies and enriches the overall school experience" (Lieberman & Hoody, 1998).

As you peruse the Project EXCITE Taking Action newsletter you will come across several testimonials from area schools highlighting the benefits



of EHS for motivating young learners. Over the last 18 months, Ohio 4th - 9th grade students investigated such EHS topics as the health of the indoor environment of their schools, the placement of a new power plant, urbanization's effect on the school campus, and how household chemicals affect one's health. Together, 30 teachers, 6 student teachers and some 900 plus dynamic students successfully investigated their local problems using a variety of community resources. The students positive response to EXCITE shows that EHS can be a powerful integrating context for learning. ✂

Successful Recruitment for Cohort 2

Recruitment for the second cohort of participating of teams was recently completed with an overwhelming response from over 50 outstanding applicants representing 14 teams. Cohort 2 will begin their 2003-2005 EXCITE experience with a kickoff retreat weekend at Maumee Bay State Park and the Lake Erie Research Center June 20-21, 2003. Professional development continues with a two-week summer institute at Bowling Green State University July 28-August 8, 2003.

During the two-year commitment, teacher teams will jointly design a problem based learning unit focusing on a locally relevant environmental health topic, implement the unit with their students, and ultimately submit their unit for publication in 2005.

Benefits for participating teachers include: \$1000 stipend, 10 grant funded graduate credit hours, and release time for the professional development activities.

The six participating Cohort 2 schools are Arcadia, Findlay Central Middle School, Fostoria Middle School, North Baltimore Middle School, Toledo St. Pius X, and Liberty Center Middle School. Congratulations teams and welcome!

Get Real with EHS!

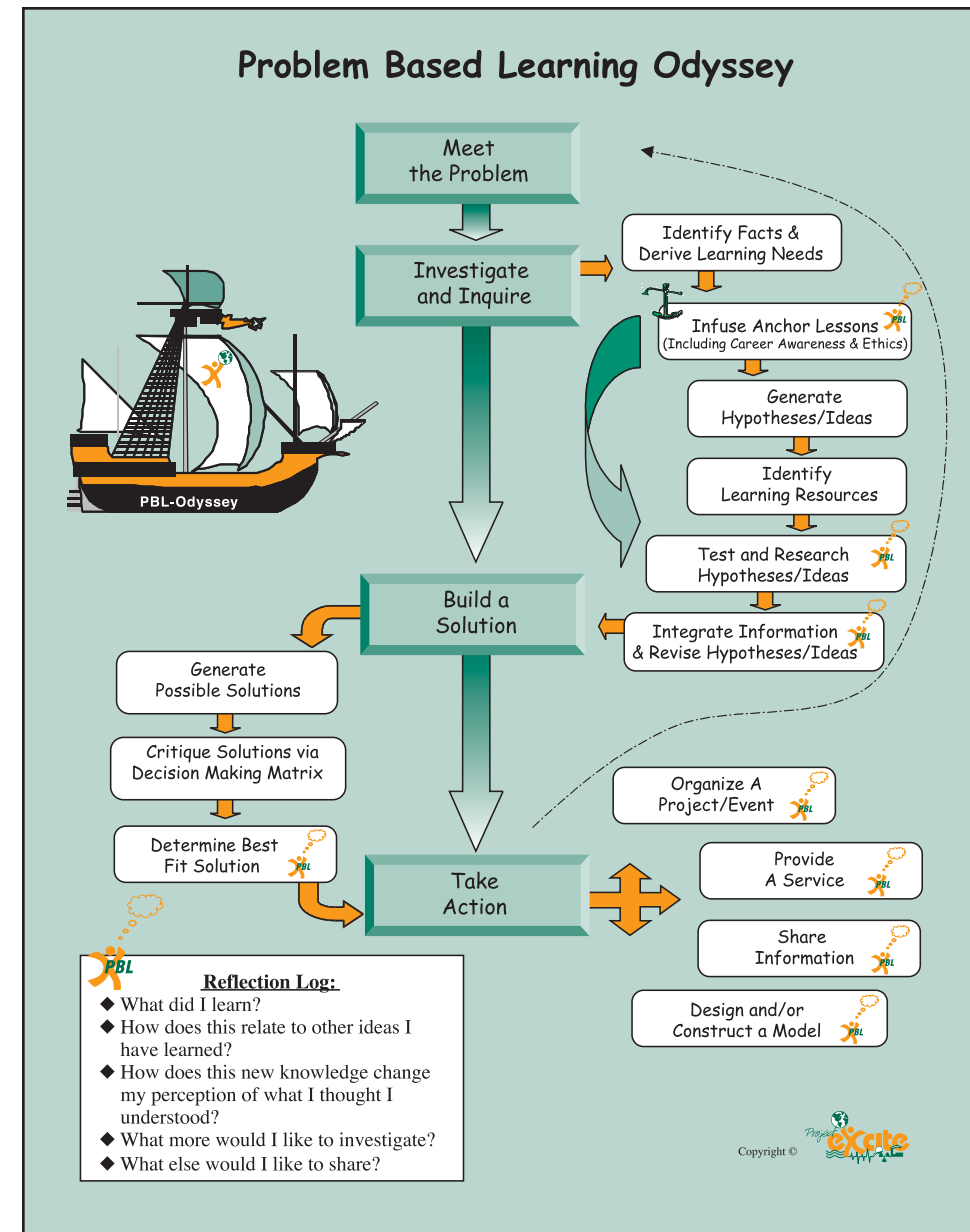
SPRING 2003

FROM PROBLEM SOLVING TO TAKING ACTION!

By Dr. Jodi J. Haney, Project Co-Director

An Elementary School in Northwest, Ohio closes temporarily because of a suspected uncontrolled mold growth. Students in a new "state of the art" high school complain of severe headaches, nausea, and lightheadedness. A rural community in central Ohio protests that a nearby family farm is responsible for potential community health issues. Headlines such as these are commonly found in local newspapers and television newscasts alike. These news stories highlight environmental problems facing our communities and provide important information about the potential causes and effects. Meanwhile, schools and teachers are faced with the difficult task of motivating students to learn the outlined local, state and national standards that guide our educational systems. So why not dive into real problems and help generate real solutions, while at the same time attaining current educational goals. Sound Intriguing? Let problem based learning show you the way.

Problem based learning (PBL) is an educational strategy that has received a great deal of attention over the past several years. PBL is really not a new idea. The model has roots in John Dewey's Progressive Education era (originating in the early 1900's), as it is a highly student centered strategy that offers students' educational opportunities to investigate real world issues. Problem based learning gained recognition through its popularity with medical schools in the early 1960's. Disappointed with the level of performance of their students in the field, the Harvard Medical School curriculum team sought out new instructional strategies to better prepare their students for the realities of the profession. To put PBL strategies to the test, in the early 1980's Harvard researchers examined the performance of students experiencing PBL strategies in comparison to students experiencing the traditional curriculum. The data revealed that the PBL students scored slightly higher on achievement tests, but the real gains were noted in the PBL students' performance-based skills that are required of practicing physicians (Torp & Sage, 1998). Since this time, many medical schools across the county employ PBL to enhance the readiness of their graduates for the world that awaits them.



Problem Based Learning

Many other research studies show similar effects. In general, PBL research shows a slightly positive effect on achievement scores with much larger positive gains on indicators such as: critical thinking and problem solving skills, abilities related to accessing, analyzing, organizing, and communicating information, student attendance patterns and disciplinary behaviors (Glassgow, 1997; Jones, Rasmussen & Moffitt, 1997). Perhaps one of the most interesting benefits of problem based learning is that parents report that their children discuss what they are learning in school even before they are asked!

There are many models to guide PBL experiences, however underlying all of the PBL models are ill-structured, interesting and relevant problems for students to solve using inquiry skills. The medical models are case study based and typically start with a short vignette of a patient suffering from a few noted symptoms. Medical students then use these clues to access further information and make a diagnosis. Other PBL models present students with an interesting and relevant problem, offer students opportunities for hypothesis testing through inquiry, and use decision making strategies to derive a solution.

The project EXCITE PBL model, called an Odyssey to signify an active and process-oriented voyage, infuses ideas from the best available models and offers a unique and important dimension (service learning) in the final phase of the learning experience. Our PBL Odyssey model consists of four main phases: Meet the problem, Inquiry and Investigation, Building a Solution, and Taking Action (see figure).

During the Meet the Problem phase, students are presented with an ill-structured and developmentally appropriate local problem to investigate. After the students have outlined what they currently know and what they need to know about the problem, they identify possible resources for learning and generate a beginning hypothesis (an inference as to the cause of the problem). They then devise a plan to guide them through the next learning phase, Inquiry and Investigation. Here, students use inquiry skills and available resources to uncover needed information in order to revise their hypothesis. When students have unraveled the problem and have constructed deeper understandings of the related content, they generate possible solutions to the problem. They then use critical thinking skills to weigh the pros and cons associated with the possible solutions in order to establish a best-fit solution. Learning does not stop here however, as the richest part of the experience is yet to come. After students decide upon a best-fit solution, they develop a plan to take action, encouraging active citizenship and social responsibility.

Action projects might consist of creating an informational product to communicate their newly constructed knowledge, designing and constructing a model or prototype, developing an action oriented project, or voicing concern through letter writing, campaigning, etc. Reflectivity is emphasized throughout the Odyssey as students are given frequent opportunities to respond to questions in a daily reflection log.

Importantly, EXCITE Odysseys are interdisciplinary. They promote both a deeper understandings of content and the acquisition of skills related to science, mathematics, language arts, social sciences and health, among others. Because they are framed by real problems that face real people, they provide opportunities for students to examine, discuss, and clarify the ethical issues related to the problem at hand.

Critics of PBL claim that ill-structured learning negates teacher planning, active instruction, and a curriculum linked to local, state, and national educational standards. To the contrary, PBL teachers must over plan and over prepare, since students' inquiries will take many turns along the way. Problem based learning teachers implement and assess student learning using research based strategies such as cooperative learning, inquiry, and authentic assessments. Moreover, the PBL experience is framed by educational standards and is easily woven across the curriculum.

Over the past 18 months, interdisciplinary teacher teams in Northwest and Northeast Ohio have designed and implemented locally relevant PBL Odysseys focusing on environmental health science issues such as indoor air quality, household chemical exposures and urbanization. Their Odysseys will be available as national curriculum models in the near future. Sound EXCITING? Stay tuned!

References:

- Torp, Linda, Sage, Sarah. (1998). Problems As Possibilities: Problem Based Learning For K-12 Education. Alexandria, VA: Association For Curriculum And Development.
- Glasgow, Neal. (1997). New Curriculum For New Times: A Guide To Student-Centered Problem-Based Learning. Thousand Oaks, CA:Corwin Press, Inc.
- Jones, Beau Fly, Rasmussen, Claudette M., & Moffitt, Mary C. (1997). Real Life Problem Solving: A Collaborative Approach To Interdisciplinary Learning. Washington D.C.:American Psychological Association. ✂

INDOOR AIR QUALITY IN SCHOOL BUILDINGS

By Beth Ash, Graduate Assistant

What is Sick Building Syndrome and How Can it Affect my School?

Indoor air quality in schools and other closed buildings can cause a variety of health effects. These related health effects can include lethargy, fatigue, dizziness, nausea, irritation of the eyes, nose and throat, and upper respiratory problems such as asthma and persistent coughing. The symptoms often appear shortly after arriving at school and disappear several hours after leaving. These health effects have an impact on the productivity and absenteeism of students, faculty and staff in the school building. The health problems that are associated with Sick Building Syndrome usually are caused by a variety of pollutants in the air system of the school. Here are some examples of pollutants:

- Particulates - airborne dirt, dust, lead and asbestos
- Volatile Organic Compounds (VOC's) - chemicals or gases that can come from building materials, carpets, furniture, copiers, and other office equipment
- Biologicals - bacteria, mold, and mildew
- Radio-nucleotides - radon

Tips to Avoid Sick Building Syndrome in Schools:

1. Conduct Indoor Air Quality investigations to identify potential sources of contamination. Investigators should be familiar with Heating, Ventilation & Air Condition (HVAC) zones and complaint areas.
2. Implement a maintenance program for HVAC systems such as periodic cleaning and removal of filters and cleaning of drip pans.
3. Replace all water-stained ceiling tiles and carpeting.
4. Contaminant sources should be vented outside of the building.



5. Paints, adhesives, solvents, and pesticides should be stored and used in well-ventilated areas.
6. Limit use of pollutant sources to periods of when the building will not be occupied.
7. Increase air ventilation rates and air distribution.

References:

<http://www.epa.gov/iaq/pubs/sbs.html> ✂

WHAT IS PROJECT EXCITE?

Project EXCITE (Environmental health science explorations through Cross-disciplinary & Investigative Team Experiences) is a 1.8 million dollar, seven-year grant partnership between The National Institute of Environmental Health Sciences, Bowling Green State University, and several area school districts. Project EXCITE provides professional development to interdisciplinary teams of middle grades teachers in order to develop locally relevant Environmental Health Science (EHS) problem based learning units. Each team implements their unit in the classroom to engage their students in valuable learning experiences across the curriculum. The project reflects current thinking about effective teaching and learning and is aligned with national and state education goals. Project EXCITE emphasizes critical thinking and problem solving skills, interdisciplinary connections, collaborative learning and the use of technology. During the unit, students investigate local EHS issues, explain fundamental concepts, and apply the knowledge and skills generated in a culminating service learning project. The ultimate goal of Project EXCITE is to enhance life long learning skills and encourage students to be active and well-informed citizens. Project EXCITE is directed by Bowling Green State University Associate Professors Dr. Chris Keil and Dr. Jodi Haney.

EHS Content Corner

