

"When we started out I didn't even know what IAQ stood for. Now I understand so much and am concerned about IAQ in my home."

Young Parent Program participant

Indoor Air Quality in Northwest Schools

An electronic newsletter for school Indoor Air Quality (IAQ) exclusively for Northwest schools

Winter 2006

Hydroville Curriculum Focuses on Environmental Health

By Kaye Martin

Pregnant and parenting teens understand the importance of good indoor air quality and are receptive to a curriculum that involves solving environmental health problems.



In January, I had the opportunity to present at the U.S. Environmental Protection Agency's 6th Annual Indoor Air Quality Tools for Schools National Symposium in Washington, D.C. I was invited to speak at the opening session, "School Buildings as Tools for Teaching and Learning," which focused on the environmental and health impacts of schools on children and adults. Along with co-presenter, Sue Helback, coordinator of the Hydroville Curriculum Project at Oregon State University, we shared ideas with school administrators, facilities and operations personnel, school nurses, teachers, and parents on how to integrate indoor air quality into the classroom curriculum using the Hydroville project scenario.



The Hydroville Curriculum Project specializes in grades 9-12 outreach education for the Environmental Health Sciences Center. Through a seven-year grant from the National Institute of Environmental Health Sciences, project coordinators have developed four different problem-based scenarios



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School Indoor Air Quality Newsletter for Northwest Schools

A quarterly electronic newsletter exclusively for Northwest schools.

Please circulate this subscription opportunity throughout the Northwest to those who may be interested.

There are two ways to subscribe:

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The newsletter contains a link for subscription information.

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You will receive a confirmation message. When you reply to that message you will be subscribed and will receive all future postings. You can easily unsubscribe at any time.

This broadcast email list not only provides automatic delivery of the quarterly School IAQ Newsletter, but includes announcements about news of interest, training events, grant opportunities, and other information useful to school districts, agencies, and stakeholders involved in school IAQ and operations and maintenance.

The newsletter is an opportunity for all interested parties to communicate, and add to the collective wisdom.

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for high school students, which center on solving real-life environmental health science problems.

The scenarios are:

- A pesticide spill;
- A mysterious illness outbreak;
- Contaminated drinking water; and,
- An indoor air quality problem.

Each scenario includes a 10-minute video that introduces the problem, which always takes place in the fictitious town of Hydroville. The students are required to work together as a team to solve the problem. The curriculum includes background lessons and teambuilding activities to give the students the necessary knowledge and skills to accomplish the task.

Since I have piloted all four scenarios, I was chosen to represent HCP at this year's symposium. I have taught science at alternative high schools for at-risk students. Currently, I teach pregnant teens and students with children at the Young Parent Program in Springfield, Oregon. The HCP curriculum has been a positive addition to our program because of its integrated approach to teaching, which encompasses science, language arts, math, social studies, and health concepts.

For example, national science standards and Oregon State benchmarks map out when we teach the water cycle, the nitrogen cycle, and the food chain. Incorporating environmental health science into those topics has added a real-life perspective on what happens when those cycles are interrupted by human intervention and chemical exposure. The impact on their daily

lives is the hook that has drawn my students into Hydroville curriculum and environmental health science.

When I pilot tested Hydroville's indoor air quality curriculum last spring, it had a tremendous impact on my students because they could see that IAQ in the classroom affects their ability to learn and do their best. Since I teach pregnant and parenting teens, I have the added responsibility of impressing on them the importance of good indoor air quality, not only for themselves but for their unborn babies and young children. I was pleased to see the passion with which my students responded as they realized the implications of this subject for their babies and in their homes.

That passion revealed itself through a serendipitous encounter I had with Rich Prill, an IAQ specialist with the Washington State University Extension Energy Program. Our school district has used the Tools for Schools program for several years, but recently they have been using the TfS model for custodial staff in-services, and conducting IAQ building walk-throughs of all the schools.

Last spring, Rich was invited to our school district to conduct building walk-throughs with our district risk manager. Their visit to the high school happened to coincide with my implementation of Hydroville's IAQ curriculum. As it happened, they stopped by my classroom, which is a portable located on the high school grounds. As they entered my classroom to conduct a walk-through, my students were in the middle of an IAQ lesson. Rich

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was carrying his diagnostic equipment: a carbon-dioxide monitor, a particulate meter, and a smoke tube.

You would have thought it was Christmas as the students realized they had an IAQ expert in their midst! My students knew immediately what these gentlemen were doing since they had just completed one of the IAQ background activities that introduces them to building walk-throughs and also gets them to practice this skill by completing a walk-through of our classrooms.

Suddenly, the students started peppering Rich with questions and he was gracious enough to give us a spontaneous question-and-answer time.

I was so encouraged to hear the students using their vocabulary words, asking about volatile organic compounds, out-gassing, mold symptoms, insufficient venting, how to apply the federal permissible exposure limits to children, and deal with a faulty heating, ventilation and air conditioning system.

The students also showed him the 3-D model of the Hydroville Middle School they built, which included a representation of the HVAC system. They pointed out the classrooms with IAQ complaints, listed occupant's symptoms, and discussed their suspicions about the origins of the school's IAQ problem. At that point I had to intervene since the Hydroville curriculum is an investigative problem-based curriculum, where students need to solve the problem and develop their own remediation solutions. Rich was about to divulge an important part of the problem that the students are supposed to discover through a mold spore activity we hadn't done yet. They were frustrated with me, but it didn't dampen my enthusiasm for the experience.

Rarely do teachers get such spontaneous evidence that our students have grasped difficult concepts, made sense of new vocabulary, and assimilated the knowledge enough to form intelligent questions. If I wasn't

sold on Hydroville and the importance of teaching environmental health science before – which I was – that experience would have made me a believer. As teachers at the Young Parent Program, we have resolved to include the Hydroville indoor air quality scenario in our life skills health curriculum, which is taught every year to all our students. The U.S. Environmental Protection Agency has wonderful, grade-appropriate brochures that we keep on hand... and they're free!

Because of my efforts and involvement with teaching IAQ to my students, I received a Special Achievement Award at the symposium. I was also invited to speak at the final session, "Kids Making a Difference," to share my classroom experiences, and talk about the benefits to my students of Hydroville's indoor air quality curriculum.

Here are some of the students' written and verbal responses, which I have collected. Their interest in IAQ, and the Hydroville curriculum in particular, says it all:

"The teamwork was the hardest and the best part. I still can't believe you made me work with (student name omitted), but we cooperated and you were right, our presentation turned out really tight. I was so proud of our team and myself. I was shaking in my

boots, but when I was done I had the biggest smile on my face. I did it! I worked on something really hard and now I feel really smart... on IAQ stuff that is!"

"I got behind on my background activities. I wanted to quit. This is really hard work and you have to think every day. But my group encouraged me and helped me. Positive peer pressure got me to school every day the last week as we got ready for our presentations to the school board. I think that's the first time I've had perfect attendance all semester. Don't start getting your hopes up though. That really took it out of me!"



Kaye Martin tells the Tools for Schools Symposium audience about the Hydroville Curriculum Project.

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Oregon Students Tie Room Temperature to Achievement

Three Oregon high school students won a free trip to Washington, D.C., to accept an award for their science experiment showing how room temperature can affect test scores, according to an article in the Beaverton Valley Times.

Julio Montano, Jose Perez and Josean Perez are members of the Science Research Club at Westview High School in Beaverton. Last year, the trio took third place in a local science fair with their project that concluded students in a 71-degree room did better on a test than those in a 61-degree or an 81-degree room.

The U.S. Environmental Protection Agency gave the students a Special Achievement Award for their work and paid their way to the Indoor Air Quality Tools for Schools Symposium in Washington, D.C., where they received a standing ovation.

“For me personally, people there took me seriously,” Jose Perez said in a newspaper article. “And they were amazed at my result.” Two of the students are now working on an indoor air quality project involving classroom odor.

See the Beaverton Valley Times article at www.beavertonvalleytimes.com/article/10275



Westview High School students Julio Montano (left) and Josean Perez at the U.S. Environmental Protection Agency's Indoor Air Quality Tools for Schools Symposium.



Westview High School science teacher Debbie Cooper accompanied three students to Washington, D.C., to accept an award at the U.S. Environmental Protection Agency's Indoor Air Quality Tools for Schools Symposium.

School Walk-Throughs Take a Commonsense Approach

By Dave Blake, Northwest Clean Air Agency

At a recent national symposium, a colleague and I used slides gathered during hundreds of school visits to share practical tips and useful philosophies for conducting walk-throughs to assess indoor air quality.

The presentation was part of the 2006 U.S. Environmental Protection Agency Indoor Air Quality Tools for Schools National Symposium held in Washington, D.C., in January. Rich Prill, of the Washington State University Extension Energy Program, and I took participants on a virtual walk-through evaluation of a typical school building – top to bottom, inside and out. Our objective was to present a meaningful one-hour presentation loaded with practical guidance.

What I found very satisfying was that the symposium's diverse audience of teachers, school nurses, union representatives, administrators, finance officers, loss control specialists, facility managers, health officials and others responded so warmly to the commonsense approach that has evolved as Rich and I have refined our walk-throughs. Here is a summary of key points regarding our walk-through 'philosophy':

- Have patience when seeking buy-in from administrators for IAQ program development. Remember, they are just learning about this stuff, too. Don't burn any bridges.
- Walk-throughs are non-regulatory and should be non-threatening.
- Walk-throughs are a practical learning experience for staff that builds awareness, confidence and skills – essential elements of a sustainable IAQ program.
- Walk-throughs send a positive message to staff and parents.
- Walk-throughs are an essential step to providing baseline information to shape IAQ program content and priorities.
- Walk-throughs are not a science project – look for 'good practices' compared to commonsense benchmarks: dry, clean, comfortable, pollutants controlled, adequate ventilation.
- Measurements taken must yield useful information – or don't bother.
- When measurements are taken, post results for staff right away. No secrets.

- Point out potential problems, but don't overreact or be alarmist ("It's not a problem unless it's a problem").
- Have a post-walk-through debriefing: Review and build on existing 'good practices' to create an IAQ program for the school.
- Adopt achievable IAQ program elements to address issues.
- Offer continued support to school personnel.

Of course there was more to the presentation, with plenty of nuts-and-bolts tips for doing a walk-through, but the key to success is a positive, non-threatening approach. For a copy of the presentation (minus most of the 200 photos) go to www.iaqsymposium.com and click on Agenda in the left column. Scroll down to Friday to see the presentation titled, "The Virtual Walk-Through: Identifying and Solving Common IAQ Problems."

Having invested the time and effort to create this presentation, we are looking for more opportunities to deliver the message. Please contact us if you want to organize a meeting, or know of a captive audience looking for training in school IAQ walk-throughs and IAQ program implementation.

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School Indoor Air Quality: The Washington State Department of Health Can Help

Improving and maintaining good indoor air quality is critical to health and well-being. To support citizens and colleagues in promoting quality indoor air, the Washington State Department of Health shares information about the effects of exposure to indoor air contaminants such as mold, asbestos, formaldehyde, carbon monoxide, and mercury.

Our staff:

- Provides informational material on our website;
- Makes presentations to citizen and professional groups;
- Provides technical assistance and training to local health jurisdictions, school staff and professional associations;
- Maintains a school environmental health and safety website at www.doh.wa.gov/ehp/ts/School/default.htm;
- Maintains an indoor air quality website at www.doh.wa.gov/ehp/ts/IAQ/default.htm.

To promote a healthy environment in the classroom, department staff provides information on indoor air quality best management practices, ventilation, contaminant source control and cleanup, moisture and mold control, and the U.S. Environmental Protection Agency's Tools for Schools program. The department also provides guidance documents, including:

- The "Health & Safety Guide for K-12 Schools in Washington," at www.k12.wa.us/SchFacilities/HealthSafetyGuide.aspx; and,
- The "School Indoor Air Quality Best Management Practices Manual," at www.doh.wa.gov/ehp/ts/IAQ/schooliaqbmp.pdf.

To increase our effectiveness and efficiency we collaborate with local health jurisdictions, regional air agencies, Washington State University Extension Energy Program, school staff, education associations, housing and rental associations, analytical laboratories, indoor air quality workgroups, and other professional associations. We are currently helping the Washington State Board of Health revise the rules on school environmental health and safety (Chapter 246-366 Washington Administrative Code).



Washington State Department of Health, school and indoor air quality program staff: (left to right) Nancy Bernard, Paul Marchant and Laura White

Program Staff Changes

For most of his 14 years with the department **Tim Hardin** was the primary voice for the indoor air quality program. He recently moved to the Tacoma-Pierce County Health Department to work in their expanding School Environmental Health & Safety Program. Among his many IAQ activities with the state Health Department, Tim says he is proudest of his work with EPA's Tools for Schools program. EPA recognized his contributions with a 2004 Special Achievement Award for his outstanding commitment to a healthy school environment. Tim's work on behalf of the state Health Department is greatly appreciated. Pierce County schools will benefit from his experience, skills and dedication.

Nancy Bernard joined DOH in 2003. She is the program manager for the School Environmental Health & Safety Program, which includes IAQ issues. Nancy has degrees in environmental health, and health education. She worked as an environmental health specialist for the Bellingham-Whatcom County Health District, developed and taught hands-on science in elementary schools, worked as an education specialist for Public Health–Seattle & King County, and is in her ninth year on the Lake Washington School Board.

Laura White has worked in the IAQ Program since 2003. She received a bachelor's degree in environmental science with a concentration in industrial hygiene

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Health and Indoor Environments: The Dangers of Enclosing Space

By Russell Crutcher, Microlab Northwest

I have a little piece of land on the east slope of the Cascade Mountains. The nearest road is half a mile away. The nearest village is three miles away. The nearest town with a population over 5,000 is more than 30 miles away. The air is fresh and clean in this little pine forest retreat. I put up a permanent tent, a yurt, as shelter from rain, snow, wind and sun.

By enclosing a piece of this clean, fresh air I have created an indoor environment. It is no longer the same as the air outside. The dirt I carry into the yurt stays there unless I clean it up. The pollens and spores that are airborne come into the space and can't get out. They don't become locked in the soil or stuck to some surface never to be airborne again. They collect on surfaces that are easy to clean, if I clean them. They may collect for weeks while I am unable to visit. When I finally get there the exposure in the yurt can be ten times and more as bad as the exposure while walking up the hill to the yurt. Insects get into the yurt on occasion. Insects outside die and become part of the soil. Inside they die, dry up, get crushed and become part of the airborne particle load.

I have solar panels near the yurt so I have power. I have a propane heater that draws air from outside and exhausts outside, so I have clean heat. I cook on a propane burner and that adds moisture and carbon dioxide to the environment but a tent is "leaky" so that's not a problem, except in the winter when the leak rate drops. In the winter everything gets wet. It's cold outside and warm in the yurt because I'm using the heater. There's not a lot of insulation so the walls and ceiling of the yurt are much cooler. The moisture in my breath, coming off my body, and from cooking raise the humidity in the air around me, which is fine, but near the cooler surfaces of the yurt the air can't hold all that water and it condenses. These surfaces are now warmer than outside and saturated with moisture.



Mold could be a problem. That doesn't happen to the outside surface of the yurt.

This is a long introduction but the point is that even in pristine environments enclosing space causes problems. Some of these problems affect our sense of well-being or are objectionable aesthetically. Others may be more subtle and have an effect on our long-term health without us ever knowing, like the outcropping of naturally occurring asbestos up the hill from the yurt. The dust that collects inside the yurt is the dust that can penetrate deeply into the lungs. I might complain about the dust, the insects, and the dirt I carry in, but I would never notice the asbestos had I not analyzed for it. There is a difference between "health" and "health complaints." I'll notice the allergic response as I dust and sweep the yurt but that will have little impact on my longevity. I won't notice the asbestos fibers infiltrating my lungs, which may decrease my longevity.

This is the first of a series of articles designed to address the issues of indoor environmental quality in simple terms. The yurt may show up from time to time just to illustrate one point or another. Two points have hopefully been made here:

1. Enclosing a space, any space, creates health and engineering challenges.
2. Health complaints are not the same as long-term health impairment.

Future articles will deal with specific issues related to these two points. The cause of health complaints in indoor environments will be the focus. What causes specific symptoms, how to sample the environment for those causes, what the laboratory response should look like, and how to interpret the results will be discussed.

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Hydroville

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“This curriculum is something you can really take pride in. When we started out I didn’t even know what IAQ stood for. Now I understand so much and am concerned about IAQ in my home. You’ve got me reading cleaning labels. I even checked the HEPA filter rating before we bought a new vacuum cleaner.”

More information on the Hydroville Curriculum Project is available at www.hydroville.org. The indoor air quality curriculum will be available in late spring 2006.

IAQ: Washington State Department of Health

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from East Central University in Ada, Oklahoma. Laura worked as an environmental health specialist in both Clallam and Mason counties, primarily in on-site sewage programs. She has also worked on drinking water issues, water labs, wells and water systems, swimming pools, and school programs. Laura’s primary IAQ focus is asthma awareness and prevention. She is a member of the Washington State Environmental Health Association and has been a registered sanitarian since 1999. Laura has also served a three-year term on the Board of Registered Sanitarians.

Paul Marchant joined the School & IAQ Program in January. He has degrees in environmental studies,

and environmental and occupational health. Most recently, Paul worked in the department’s Clandestine Drug Lab Cleanup Program. Prior to that, he worked in the department’s Environmental Health Assessments Office, and the state Department of Ecology’s Toxics Cleanup Program, and did hazardous-waste-generator inspections in California. Paul is enthusiastically developing his knowledge and skills in the area of indoor environments.

For more information about indoor air quality resources and services offered through the Washington State Department of Health, contact Nancy Bernard at (360) 236-3072, or nancy.bernard@doh.wa.gov.

Dangers of Enclosing Space

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The answers may not always seem intuitive but they will be explained and, hopefully, become obvious. The issues of cost may also come up from time to time. Not just the cost of the investigation and analysis, but also the cost of doing nothing. To some of you these concepts will be quite familiar but the illustrations may be helpful in talking with a client. Hopefully, you will find these articles useful.

Microlab Northwest specializes in the identification of particles and their sources. The Redmond, Washington-based company provides indoor environmental quality analysis to assess the source of contaminants, the likelihood of health complaints and the role of the environment.

Visit their website at www.microlabnw.com.