Healthy Schools Guide

Blissfield Community Schools
2005 Michigan Community Pollution Prevention School Chemical Waste Reduction Grant Recipient

The Healthy Schools Guide contains information, tools, and outreach materials to integrate a Pollution Prevention (P2) ethic within K-12 schools, helping to create a safer and healthier learning environment for students and staff.

This Guide provides the information and tools needed to eliminate and/or minimize the use of toxic chemicals in both the classroom and school facility operations along with information on high performance schools, energy efficiency, small-scale chemistry, green building/renovation, school bus idling reduction, pest management, and radon awareness.

The Healthy Schools Guide is divided into sections directed toward:

- Administrators
- Facility Managers
- Transportation Managers
- Teachers
- Students

Within each section, descriptors and links are given to lead the user to the most up-to-date state and national resources.

HEALTHY SCHOOLS Framework

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A
Administrators

More than 1.6 million students and about 180 thousand adults spend a significant portion of their days in more than 3,500 public school buildings in Michigan. Many of these buildings are old and in poor condition, and may contain environmental conditions that inhibit learning and pose increased risks to the health of students and staff. The Healthy Schools Guide is designed to provide one-stop access to the many programs and resources available to help prevent and resolve environmental issues in schools.

HealthySEAT
Healthy School Environments Assessment Tool

EPA has developed a new software tool to help school districts establish and manage comprehensive school facility self-assessment programs. The *Healthy School Environments Assessment Tool* (**HealthySEAT**) contains a fully integrated environmental health and safety checklist and is designed to be easily customized to reflect state and local requirements and policies. Read more...

A1
Chemical Management

Chemical Management Resource Guide for School Administrators

This practical guide can help your school reduce the use of dangerous chemicals and install safer chemical management practices. It is aimed especially at helping school administrators to set policies that protect against dangerous chemical exposures. Chemical Management Resource Guide for School Administrators, December 2006 (PDF) (42 pp., 2.1 MB)

Executive Summary (HTML)

A2
Hazardous Materials Handling

Michigan Hazardous Waste Programs

Control of hazardous wastes in Michigan is accomplished through a set of interrelated actions. These include managing the generation, treatment, storage and disposal of hazardous wastes, licensing and regulating hazardous and liquid industrial waste transportation, and informing generators of the opportunities for proper disposal of hazardous and harmful wastes generated.

NIOSH Safety Checklist Program for Schools & Emergency Procedures in Schools in the Event of a Chemical Spill

A3
Energy Efficiency/Energy Star

ENERGY STAR for K-12 School Districts

Establish a comprehensive energy management program using ENERGY STAR's Guidelines for Energy Management

U.S. Department of Energy
Energy Efficiency and Renewable Energy

EnergySmart Schools

The U.S. Department of Energy's Building Technologies Program sponsors the EnergySmart Schools Program to reduce schools' energy use. The initiative seeks to help school districts by disseminating financing opportunities and providing training to building industry professionals.

Labor & Economic Growth

Michigan's public sector buildings are more costly to operate as a result of rising energy prices and demand. The Energy Office offers services through the Rebuild Michigan Program to encourage Michigan's public schools, to invest wisely in energy efficiency.

A4
Mercury

Mercury (Phase-out) in Schools

Michigan schools must phase out mercury use in the classroom and in the health office. This law applies to liquid (free flowing) elemental mercury, as well as, mercury-containing instruments such as thermometers, barometers, manometers, and sphygmomanometers. Schools have until 2004 to complete the process. The step-by-step Mercury Elimination Guidelines for Michigan Schools has helpful information for completing this process.

Schools and Mercury

This site provides information for school administrators, faculty, staff, local health jurisdictions, and parent groups on how to reduce the hazards of mercury on children's health, avoid chemical liabilities, develop planning tools, and establish collection programs for mercury.

A5
Radon

The EPA ranks indoor radon among the most serious environmental health problems facing us today. A nationwide survey of radon levels in schools estimates that nearly one in five has at least one schoolroom with a short-term radon level above the action level of 4 pCi/L (picoCuries per liter) - the level at which EPA recommends that schools take action to reduce the level.

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Radon Problems at School or Work

Elevated radon levels can occur in any indoor environment, and exposure in the school or workplace can increase one's risk of developing lung cancer. Information on testing procedures can be found in Radon Measurement in Schools, Revised Edition**,** and information about the school survey can be found in Indoor Radon In Michigan: School Survey Summary**.**

Additional Radon Resources For Michigan

A6
Recycling/Recycled content

General recycling information

Recycling is a major component of waste reduction efforts. Often, recycling is the first step schools take toward a more efficient and cleaner operation.

Buying Recycled Products and Environmentally Preferred Purchasing

There is more to recycling than collecting materials. In order for a material to be truly recycled, it has to be processed and manufactured into a valuable product. This completes the recycling circle. Environmentally Preferred Purchasing (EPP) includes recycled content as part of the products targeted to be purchased as a sustainable school practice.

A7
Idle Reduction

Clean School Bus USA National Idle-Reduction Campaign

Unnecessary school bus idling pollutes air in and around the bus, wastes fuel, and causes excess engine wear. Fortunately, it's easy to implement practices that reduce school bus idling. The Idle-Reduction Campaign Do-it-Yourself Kit is available to school districts or other organizations.

School Bus Idling Policy

A sample anti-idling policy that could be used to reduce emissions from school bus engines.

A8
Integrated Pest Management

Michigan's IPM Law This page, maintained by the Michigan Department of Agriculture, outlines the requirements and training in Michigan.

Integrated Pest Management (IPM) in Schools

The EPA recommends that schools use integrated pest management (IPM) to reduce pesticide risk and exposure to children. IPM is a safer and usually less costly option for effective pest management in a school community. An IPM program takes advantage of all pest management strategies, including the judicious and careful use of pesticides when necessary.

700 IPM practices for use in school buildings and on school grounds, as well as more than 250 resources for information on how to implement those practices, school pest management practice surveys, and a directory of organizations with resources for school IPM.

A9
Green Building

EPA High Performance School Program

High performance schools are facilities that improve the learning environment while saving energy, resources, and money. The key is understanding the lifetime value of high performance schools and effectively managing priorities, time, and budget during the design and construction process.

U.S. Green Building Council LEED for Schools

LEED for Schools is the recognized third-party standard for high performance schools that are healthy for students, comfortable for teachers, and cost-effective. LEED for Schools gives parents, teachers and the community a “report card” for their school buildings, by verifying that schools are built healthy, efficient, and comfortable. Students will learn better, teachers will be more satisfied, and schools will run more efficiently.

M
Facilities & Maintenance

Facilities personnel (e.g., facilities managers, custodians, and anyone dealing with cleaning and maintenance supplies) are instrumental in providing a healthy and safe school environmental for students, staff and visitors alike.

M1
Hazardous Materials Handling

The Waste and Hazardous Materials Division administers a diverse number of prevention programs to protect the environment and the public's health through proper management of hazardous products; solid, liquid, medical, and hazardous waste.

M2
Chemical Management

Responsible chemical management helps ensure that the chemicals in schools do not endanger students and school personnel and incorporates the following practices:

- Complying with state and local purchasing, use, storage and disposal guidelines;
- Ensuring that all facility maintenance staff members receive effective training and have the tools needed to keep school facilities in good condition;
- Building awareness of the issue with others in the school system;
- Obtaining support at all levels within the school to address chemical use and management;
- Working cooperatively with district wide contacts (superintendent, facility manager, etc.);
- Becoming involved in policy development associated with chemicals; and
- Purchasing and using less toxic cleaners.

M3
Recycling

For a school recycling effort to succeed, it is imperative that maintenance staff are involved in the planning process and are part of the Recycling Team. Proper collection, sorting, storage and transportation access for the recyclable materials will impact facilities operation.

Maps and locations of recycling centers in Michigan, listed by county.

M4
Integrated Pest Management

Michigan schools are required to have a verifiable IPM Program in place for each building. Should pesticide be used, a pesticide applicator must attend a Michigan Department of Agriculture approved IPM Training Program before making a pesticide application in schools.

Integrated Pest Management for Schools: A How-to Manual provides information on pest prevention using effective, least-toxic methods is proving practical to apply and cost-effective to operate.

M5
Green Cleaning

healthy schools campaign **GREEN CLEAN SCHOOLS**
A national partnership to green America's schools

Members of the custodial staff, especially women of child-bearing age, are particularly susceptible to health problems caused by their frequent and close interaction with cleaning chemicals and equipment. Choosing safer products and training staff in proper usage can help reduce the number of injuries caused by caustic chemicals and dangerous equipment, helping to decrease Workers' Compensation claims, and lower insurance costs.

Green Seal is an independent non-profit organization dedicated to safeguarding the environment and transforming the marketplace by promoting the manufacture, purchase and use of environmentally responsible products and services. A vast array of facility services products can be found which are Green Seal certified.

M6
Radon

Elevated radon levels can occur in any indoor environment, and exposure in the school or workplace can increase one's risk of developing lung cancer. Since school may be the second largest contributor to a child's radon exposure (or to teachers or staff), the U.S. Environmental Protection Agency (EPA) recommends that all schools be tested and that action be taken to reduce elevated radon levels.

A nationwide survey of radon levels in schools estimates that nearly one in five has at least one schoolroom with a short-term radon level above the action level of 4 pCi/L (picoCuries per liter) - the level at which EPA recommends that schools take action to reduce the level. The only way to determine if a problem exists is to test for it.

M7
Transportation

School buses are the safest way for children to get to school. However, pollution from diesel vehicles has health implications for everyone, especially children. By working together, we can reduce pollution from public school buses making sure that school buses are also a very clean way for children to get to school.

Unnecessary school bus idling pollutes the air, wastes fuel, and causes excess engine wear. Fortunately, it's easy to implement practices that reduce school bus idling.

M8
Green Building

"High performance school" refers to the physical facility, the school building and its grounds. A well-designed facility can truly enhance performance and make education a more enjoyable and rewarding experience. Creating a high performance school is not difficult, but it requires an integrated, "whole building" approach to the design process. Key systems and technologies must be considered together, from the beginning of the design process.

U.S. Green Building Council

LEED for Schools

The Leadership Energy and Environmental Design (LEED) for Schools Green Building Rating System recognizes the unique nature of the design and construction of K-12 schools. Based on LEED for New Construction, it addresses issues such as classroom acoustics, master planning, mold prevention, and environmental site assessment.

M9
Energy Efficiency/Energy star

Energy Star for Schools

The annual energy bill to run America's primary and secondary schools is staggering — more than is spent on textbooks and computers combined. Top performing ENERGY STAR labeled schools cost forty cents per square foot less to operate than the average performers.

ENERGY STAR offers free online training to help you improve the energy performance of your organization. No travel, no lost time out of the office, and no cost — EPA makes it easy to get the information you need today. Join your colleagues to better understand how EPA can help you lower operating costs, improve your energy management program, and expand your professional development.

M10
Indoor Air Quality (IAQ)

Indoor air quality in schools is important, and regular facility maintenance and operations can do more to influence IAQ than any other school function. Healthy IAQ should be the goal of every school because good IAQ can promote student, teacher, and staff health, performance, and school attendance.

B
Bus/Transportation

School transportation staff has a tremendous role to play in both the health and safety of the students they transport and in the effects their job performance has on the environment.

B1
Idle reduction

Diesel exhaust has been identified as a likely cause of cancer, and the soot and gases emitted by diesel buses are associated with acute eye, throat, and bronchial irritation; exacerbation of asthma and allergenic responses; and potential interference with proper lung growth and development in children. School buses idling at schools can produce concentrated exhaust emissions both outside and inside school buses and school buildings.

National Idle-Reduction Campaign

Clean School Bus USA offers a collection of materials you can order to customize your own Idle-Reduction program. Pick and choose from a variety of resources, including an idle-reduction brochure, poster, teacher's guide, driver video or CD, driver key chains, and other educational material that you need to launch or enhance a successful Clean School Bus Idle-Reduction Campaign.

Idling Reduction Alternatives

EPA's list of idle reduction technologies contains detailed information about currently available idle reduction technologies. Note, the inclusion of company names and descriptions of their products is not an endorsement of the product, nor a certification or verification of the technology, and is intended for informational purposes only.

B2
Energy Efficiency

Rebuild Michigan services are available to Michigan public schools including free walk-through energy analyses for facilities that want to upgrade their building(s) with better technology and maintenance. State facilities may also request assistance with project feasibility studies, performance contracting and technical training.

Retired Engineer Technical Assistance Program (RETAP)

Teams of RETAP professionals review operations for potential waste reduction strategies and opportunities; including source reduction, reuse, recycling, and energy efficiency.

B3
Mercury

The Alliance of Automobile Manufacturers has joined with the Michigan Department of Environmental Quality in a landmark statewide mercury switch collection program for end-of-life vehicles. The purpose of the program is to collect and recycle mercury-containing switches to ensure they are safely removed before vehicles are shredded, crushed, or smelted; preventing the mercury from being released to the environment.

California Department of
Toxic Substances Control

Best Management Practices for Managing Mercury Switches from Vehicles

B4
Chemical Management

Best Management Tips for Automotive & Truck Repair Businesses from the Nebraska Department of Environmental Quality

These tips represent a first step in sound pollution prevention (P2) practices. These steps can also help decrease total costs by reducing product purchases and cutting disposal costs.

Fact sheets and videos provide complete environmental, technical and economic evaluations of the top Pollution Prevention "fixes" for auto repair and fleet maintenance operations.

B5
Hazardous Materials Handling

Michigan Hazardous Waste Programs

Control of hazardous wastes in Michigan is accomplished through a set of interrelated actions. These include managing the generation, treatment, storage and disposal of hazardous wastes, licensing and regulating hazardous and liquid industrial waste transportation, and informing generators of the opportunities for proper disposal of hazardous and harmful wastes generated.

NIOSH Safety Checklist Program for Schools

Four major sources of regulations may apply to emergencies involving a chemical spill. This resource provides guidance in setting up emergency procedures in the event of a chemical spill.

B6
Recycling

Michigan Recycled Materials Market Directory

Recycling used motor oil keeps oil out of landfills and ensures that this oil is available for re-use, reconditioning, reprocessing or re-refining. The database of recycling collectors, brokers and processors provides information about potential markets for Michigan generated recyclable waste materials based on responses from the companies to a number of questions about their operations. The quality of service provided by each company is not known or implied by this listing.

General Recycling Information

Recycling is a major component of waste reduction efforts and is part of the Michigan Department of Environmental Quality (MDEQ) Pollution Prevention Strategy. Although not the highest priority (source reduction and reuse appear ahead of recycling in every description of waste reduction and pollution prevention), it is an important and high profile portion of any approach to waste/pollution management. Often, recycling is the first step schools take toward a more efficient and cleaner operation.

T
Teachers

More than 1.6 million students and about 180 thousand adults spend a significant portion of their days in more than 3,500 public school buildings in Michigan. Many of these buildings are old and in poor condition, and may contain environmental conditions that inhibit learning and pose increased risks to the health of students and staff. The Healthy Schools Guide is designed to provide one-stop access to the many programs and resources available to help prevent and resolve environmental issues in schools.

T1
Chemical Management

Schools Chemical Cleanout Campaign (SC3)

Teachers can reduce the environmental and health hazards in their school by ensuring that classroom chemicals are managed in a responsible manner and working collaboratively to help implement a chemical management program.

Managing chemical inventories effectively can prevent many of the ills that plague science teachers: unknown chemicals, excessive inventory stocks, and poor use of materials. By managing chemical inventories in a few simple but effective ways, you can avoid many of these problems.

T2
Hazardous Materials Handling

School Chemical Safety Information

School chemical safety should be the concern of classroom teachers. Ongoing training of school staff members in appropriate safety procedures and the proper use of laboratory, custodial and grounds keeping equipment should be a high priority for every school.

Michigan Hazardous Waste Treatment and Disposal Facility List

T3
Recycling

Reduce, Reuse, Recycle

These resources will assist you in teaching your students about the waste we generate in our schools, homes, and communities—and what we can all do to make a difference! From classroom activities, to starting a school electronics recycling program, these materials will help you and your students learn what we can do to reduce and better manage waste in the world around us. Many of these resources are provided in both English and Spanish.

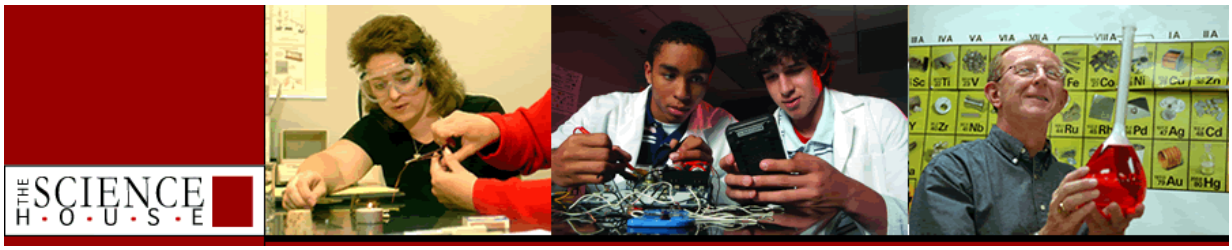
paperrecycles.org

More than 80 percent of all paper mills in the U.S. use recovered paper to make their new products. Recycling paper also helps our communities by keeping it out of landfills and incinerators. The paper that we recover for recycling helps us improve the environment and produce new paper products that we use in our every day life. This site provides lesson plans, video support, and material support for classroom recycling activities.

T4
Green/Kitchen Chemistry

chatham UNIVERSITY | WE ARE YOU

There is a lot of interesting science to investigate in this world. Not all science involves men wearing white coats. A child or teacher can investigate some pretty interesting stuff without the need for a laboratory, expensive equipment or dangerous chemicals.



This link provides kitchen chemistry activities from teacher training workshops, offered by The Science House, since the early nineties. Many teachers have taken the workshops and have applied the activities in their own classrooms – from first grade to high school.

T5
Small/Micro Scale Chemistry

National Microscale Chemistry Center

Microscale chemistry is an environmentally safe pollution prevention method of performing chemical processes using small quantities of chemicals without compromising the quality and standard of chemical applications in education and industry.

Delta College
Experience the Delta Difference

MDEQ case study of how small-scale chemistry is working at Delta College, University Center, Michigan.

T6
Green Building

High performance schools are facilities that improve the learning environment while saving energy, resources, and money. A growing number of studies are confirming the relationship between a school's physical condition, especially its lighting and indoor air quality, and student performance. These studies show that a high performance school supports:

Higher Test Scores
Increased Average Daily Attendance
Increased Teacher Satisfaction and Retention

High performance classrooms are designed to be pleasant and effective places to work. Visual and thermal comfort is high, acoustics are good, and the indoor air is fresh and clean. By incorporating important concepts such as energy, water, and material efficiency, schools can becomes tools to illustrate a wide spectrum of scientific, mathematical, and social issues.

A green school, also known as a high performance school, is a community facility that is designed, built, renovated, operated, or reused in an ecological and resource-efficient manner. Green schools protect occupant health, provide a productive learning environment, connect students to the natural world, increase average daily attendance, reduce operating costs, improve teacher satisfaction and retention, and reduce overall impact to the environment.

T7
Energy Efficiency

U.S. Department of Energy
Energy Efficiency and Renewable Energy

Energy Education

How can you help your students get smart about energy? Start here! You can get a variety of lesson plans and activities on energy efficiency and renewable energy.

Michigan Environmental Education Curriculum Support (MEECS)

The Energy Resources unit has been designed to provide Middle and High School teachers (grades 7-9) with energy lessons and materials aligned to the Michigan Curriculum Frameworks.

Students

From elementary school maintenance closets to high school chemistry labs, schools use a variety of chemicals. When they are mismanaged, these chemicals can put students and school personnel at risk from spills, fires, and other accidental exposures. Chemical accidents disrupt school schedules and can cost thousands of dollars to repair.

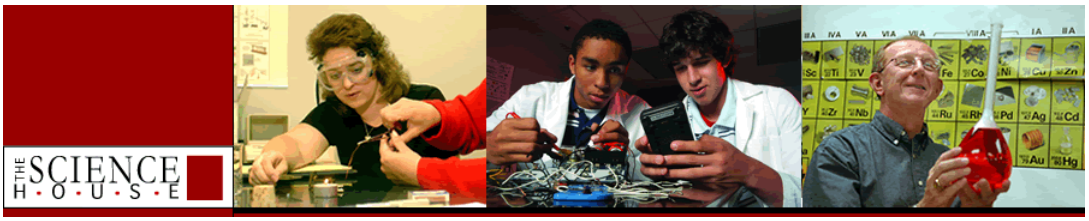
S1
Recycling

Discover the world of things we leave behind. Our waste, garbage, junk, trash, and glop must go somewhere. Reducing, reusing and recycling will help us restore and protect our environment.

S2
Green/Micro Chemistry

Dr. Slime's LABORATORIES
Http://www.delta.edu/~slime

Dr. Slime introduces students to green chemistry and micro-scale chemistry.



This link provides kitchen chemistry activities from teacher training workshops, offered by The Science House, since the early nineties.

S3
Green Building

U.S. GREEN BUILDING COUNCIL
Build Green Schools

Every child deserves to go to a school with healthy air to breathe and conditions that encourage learning.

Green schools are healthy for kids and conducive to their education. Green schools encourage:

daylight and views.
high indoor air quality.
excellent acoustics.
thermal comfort.

Numerous studies have demonstrated direct benefits to student health and performance.

daylight improves performance.
good indoor air quality improves health.
acoustics increases learning potential.
comfortable indoor temperatures increase occupant satisfaction.

S4
Energy Efficiency

U.S. Department of Energy
Energy Efficiency and Renewable Energy

Student Energy Competitions and Contests

Here you'll find resources for students of all ages on competitions and contests that promote awareness about energy technologies and issues, including energy efficiency and renewable energy.

ALLIANCE TO
SAVE ENERGY
Creating an Energy-Efficient World

Discover Your Own Energy-Saving $uper Powers with the Energy-Efficiency Tips and Resources on The Alliance to Save Energy's Consumer Web Site!

Case Studies

Healthy School
Michigan Case Study

Blissfield Community Schools

On August 19, 2005, the Blissfield Community Schools was awarded $15,200 through the Michigan Community Pollution Prevention (P2) Grant Program* for waste reduction of school chemicals. The grant addressed waste reduction of school chemicals by, not only cleaning out dangerous, excess, toxic and improperly stored chemicals, but also by going further and implementing mechanisms in schools for minimizing the use of toxic chemicals.

Minimizing chemicals in school classrooms, facilities maintenance, and bus maintenance departments improves safety for students, teachers, and maintenance staff and reduces the likelihood of spills which could result in costly clean-ups and school closures with the resulting loss of valuable education time.

Practicing waste reduction and P2 in schools teaches environmental responsibility and sets an example for the community. By emphasizing the importance of these approaches to their students, teachers can help instill habits that will be of value the rest of their lives.

School System
The school system is located in the town of Blissfield, in southeast Lenawee County. Blissfield Community Schools provides educational services to just over 1,300 students in an elementary, a middle school and a high school building. The entire K-12 educational system was involved in the project. Blissfield hoped that the grant would lead to a permanent chemical inventory process, proper disposal of waste and out dated chemicals and a reduction of chemicals stored throughout their school system.

Process
The school system partnered with two outside companies to assist them in the project. R3 Environmental Management, Inc. was tasked with developing a list of chemicals that were stored throughout the system. They evaluated all the chemicals and determined which chemicals could be used and which were to be disposed of. R3 arranged for the disposal of the non-useable chemicals. Underscore Web Design, Inc. was tasked with developing a web based utility to maintain the current inventory for the entire district.

P2 Alternatives used:

Blissfield conducted a chemical inventory throughout the entire system. This identified toxics to be removed and safety issues to be addressed.

A web based inventory control system was put into place making it possible to check out chemicals from storage, maintain totals of chemicals in storage and facilitate re-ordering chemicals when the need arises.

Blissfield purchased a data projector with a smart board and sound system to facilitate the replacement of some labs and demonstrations with “virtual” labs. In addition, a Classroom Performance System was purchased in order to involve students in making individual predictions and observations regarding the “virtual” labs.

Microscale lab supplies and planners were purchased; reducing the volume of chemicals used in lab exercises which remained part of the curriculum.

The chemistry teacher and Facilities Director were trained by Flinn Scientific Inc., on proper spill, storage and disposal techniques as well as health and well-being of students and staff.

Chemical Disposal
The project included disposal of 2020 lbs. of waste and surplus chemicals

Benefits/Savings
The school system realized many benefits as a result of activities completed during the grant. Some of the short term benefits include reduction in hazardous materials in current storage areas, recognition of safety needs in the storage room and lab areas and proper disposal techniques. Long tern benefits include technology purchases for the chemistry classroom allowing for virtual laboratories and the microscale chemistry approach, thereby reducing chemical use and waste year after year.
The inventory system will allow for the reduction in purchase of chemicals through centralized storage and retrieval practices. Perhaps the greatest benefit from the grant activities is the school system's commitment to maintaining a healthy school environment through evaluation with the Healthy Schools initiative from the US EPA.

Other positive "spin-offs" that resulted from the grant include increased safety in the chemistry laboratory and chemical storage area, administrative recognition of the benefit of technology in the classroom and web-based maintenance communications.

Project contact: Tom Kasefang, Blissfield Community Schools Administration

Healthy School resources

For more information, visit the Department of Environmental Quality Healthy Schools Web site at: www.michigan.gov/deqp2initiatives .

* Note:
During 2005 and 2006, a total of $500,000 in funding was available through the Michigan Community Pollution Prevention (P2) Grant Program for waste reduction of school chemicals. The Michigan Community P2 Grant Program is authorized under Public Act (PA) 384 of 1996, which establishes the Cleanup and Redevelopment Trust Fund with interest earned on unclaimed beverage container deposits. The Michigan Department of Environmental Quality (MDEQ) matching grants were available to schools, school districts, county governments, local health departments, municipalities, and regional planning agencies. The goal of the Community P2 Grant Program was to foster partnerships and sustainability, and to bring local government, businesses, planning agencies, and residents together to create change through P2.

Healthy School
Michigan Case Study

Grand Rapids Public Schools Chemical Reduction and Storage Program

On August 19, 2005 the Grand Rapids Public Schools was awarded $21,000 through the Michigan Community Pollution Prevention (P2) Grant Program* for waste reduction of school chemicals. The grant addressed this issue by not only cleaning out dangerous, excess, toxic and improperly stored chemicals, but also by going further and implementing mechanisms in schools for minimizing the use of toxic chemicals.

The Grand Rapids Public School system serves approximately 22,000 students in grades K-12 and is located in Grand Rapids, Michigan an urban community with a population of approximately 200,000 residents. Five large high schools and six middle schools participated in the program.

This school district, like many in Michigan, experienced the challenge of having many potentially hazardous chemicals that were no longer needed in current programs or were long outdated and still being stored in their facilities. The district identified this as a major problem realizing that immediate action was needed to identify the scope and eventual costs in remedying the situation.

As a partner in the project, the City of Grand Rapids assisted the school district on multiple fronts. The city helped in the selection of a chemist to oversee the inventory and chemical removal process, worked with the facilities and operational staff to help in the set-up of a secure centralized storage facility and the contracting of a company to dispose of the chemicals.

First Steps - Chemical Inventory and Clean Out

The chemist and the district science supervisor completed a detailed inventory of chemicals located in science labs in the five district high schools and six middle schools. Determinations of a chemical's suitability were based upon whether the chemical was of a hazardous nature, whether quantities of the chemical were excessive and whether the chemical was past its expiration date. All of the retained chemicals and their respective quantities were entered into the electronic database. This team also determined the reasonable amount of chemicals to leave in the schools, based on typical usage and organized the remaining chemicals by compatible families, thus making the storage areas considerably safer places.

In total, about 38 gallons (145 liters) of liquids was removed from the schools and 300 pounds (135 kg) of solids. Sorting and recording each of the chemicals led to the following alternative disposal options:

- Approximately 24 kg of solids and 6 liters of liquid were accepted by Grand Rapids Community College for use in their chemistry program;
- Approximately 16 kg of solids and 17 liters of liquids were accepted by U.S. EPA during their West Michigan Chemical Cleanout Campaign;
- Approximately 76 kg of solids and 70 liters of liquids were removed by R3 Environmental Services.

Chemicals found included a large number of mercury-containing devices and some elemental mercury. Some older radioactive sources were also discovered and the school district was assisted by the Michigan Department of Environmental Quality (MDEQ) in the process of removal of this material.

Centralized Chemical Storage and Minimizing Quantities of Chemicals in Schools

A cabinet was purchased to store excess quantities of corrosive chemicals that were still of use to high schools. The cabinet was installed in a location that was designed for hazardous chemical storage and was in a building that did not house students. These chemicals would then become stock that is available to schools when necessary and thus reduce future chemical purchasing needs for the district.

Three additional inspections of chemical storage areas were conducted. The chemist and the science supervisor rearranged the remaining chemicals according to compatible families in the storage areas to improve safety and efficiency. The chemist also produced a written report with recommendations to further improve the safety of the chemical storage areas.

Toxic Chemical Reduction and Chemical Hygiene

A total of 16 training sessions took place for teachers from grades 6 through 12. These sessions provided teachers with curriculum on science programs recently adopted by the school district. Particular emphasis was on the use of micro-scale chemistry where the quantities of chemicals are minimized (but reactant ratios remain the same) and chemical concentrations are much diluted, thus reducing the quantity of chemical waste generated in the classroom.

A one-day chemical safety workshop was also held in late November of 2006, providing information on chemical hygiene and management in the classroom. It included presentations by staff from the MDEQ, the U.S. EPA, Michigan Occupational Safety and Health Administration (MIOSHA), Grand Valley State University and some non-governmental organizations. Thirty-nine teachers from 33 different schools and 10 different school districts attended the workshop. Materials were provided to participants along with a CD-ROM of the presentations.

Benefits

Safe and proper removal and disposal of hazardous materials
Reduced exposure risk for students and staff
Chemical hygiene plan in place to properly manage chemicals on site
Inventory control system in place to track chemical purchasing
Curriculum changes which reduce chemical usage and disposal costs
New partnerships with the U.S. EPA, the MDEQ and MIOSHA leading to the elevation of chemical safety to a much more prominent position in the thinking of the district

Practicing waste reduction and P2 in schools teaches environmental responsibility. By emphasizing the importance of these approaches to their students, teachers help instill habits that will be of value the rest of their lives.

Challenges

A major challenge included the amount of time necessary to inspect, catalog and sort the chemicals. The entry of all of the chemicals, and their respective quantities, into the electronic database proved to be more time consuming, and knowledge intensive than originally anticipated.

An additional major issue is having teachers out of school and the classroom. Locating sufficient numbers of substitute teachers to cover classes is always a challenge for school districts.

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For more information, visit the Department of Environmental Quality Healthy Schools Web site at: www.michigan.gov/deqp2initiatives .

* Note:
During 2005 and 2006, a total of $500,000 in funding was available through the Michigan Community Pollution Prevention (P2) Grant Program for waste reduction of school chemicals. The Michigan Community P2 Grant Program is authorized under Public Act (PA) 384 of 1996, which establishes the Cleanup and Redevelopment Trust Fund with interest earned on unclaimed beverage container deposits. The Michigan Department of Environmental Quality (MDEQ) matching grants were available to schools, school districts, county governments, local health departments, municipalities, and regional planning agencies. The goal of the Community P2 Grant Program was to foster partnerships and sustainability, and to bring local government, businesses, planning agencies, and residents together to create change through P2.