# An Environmental Health & Safety Guide For K-12 School Facility Planning in Ohio


**By**

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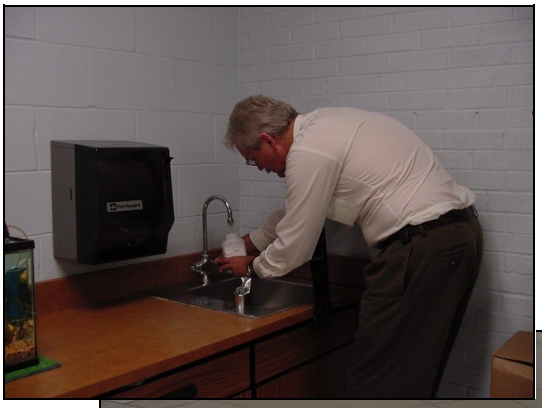
# ABOUT THE AUTHOR

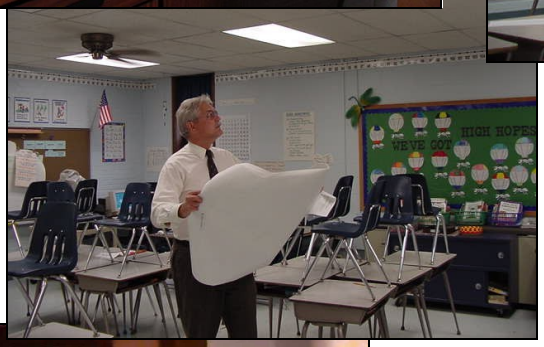
Mr. Charles Hart is consultant and trainer specializing in environmental and occupational health & safety. He holds a B.S. in Environmental Health from Cleveland State University (1976) and a M.A. in Health & Safety Education (environmental health & safety training emphasis) from Kent State University (1980). Chuck has worked in the field of environmental health & safety since 1976. He has served in public health with local health departments, the state health department, and as a County Health Commissioner and Director of Environmental Health. Since 1984, he has been specializing in institutional health & safety, in the areas of industrial hygiene, occupational safety, and biosafety at the Ohio University, Department of Environmental Health & Safety in Athens, Ohio. He is also President of his own consulting company, WorkSafe, Ltd.

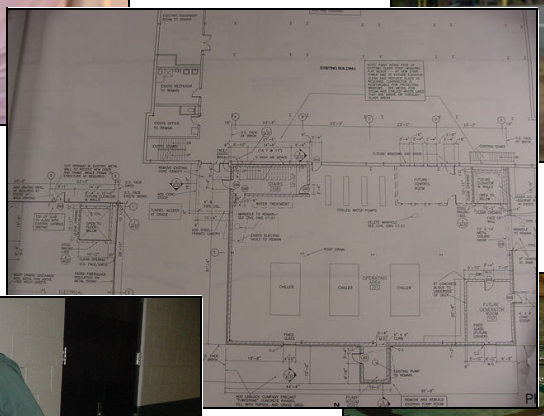
Chuck Hart has gained experience on both sides of the fence, as a regulator and as a program manager for a regulated entity. He is certified in the comprehensive practice of industrial hygienist (CIH) by the American Board of Industrial Hygiene, certified in comprehensive practice of safety (CSP) by the Board of Certified Safety Professionals, is a Registered Environmental Sanitarian (RS) by the Ohio Board of Sanitarian Registration and the National Environmental Health Association, and is a Registered Biosafety Professional (RBP) with the American Biological Safety Association. Chuck Hart has conducted numerous seminars, professional talks, published a number of professional papers, and assisted with the development of numerous employer health & safety programs and training courses. He has taught academic courses at Ohio University in the Environmental and Occupational Health & Safety Program, School of Health Sciences, and at the University of Akron and Kent State University as well. Chuck Hart is a member of numerous professional associations and is active professionally at the local, state and national levels. In 1993-94, he won the National Sanitation Foundation/National Environmental Health Association Sabbatical Exchange Award to study in the England and Scotland.

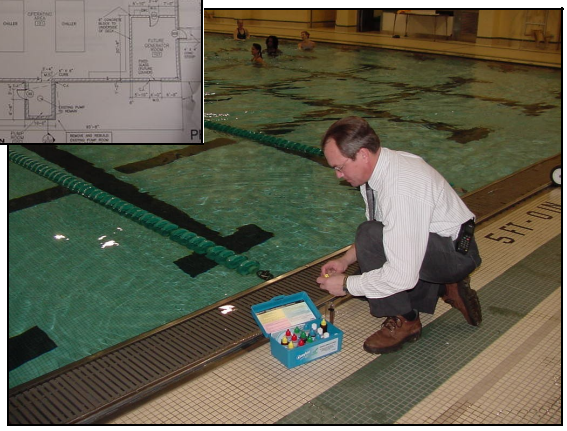
**Use of this Guide**

This Guide was developed from sources and links thought to be reliable at the time of printing. All information in this Guide is provided for informational purposes only. No endorsement of any particular agency information, organization, site, or company is given. Where company names are provided, they are listed as examples of the types of firms that are available only. The user is instructed to evaluate the accuracy and utility of all information and qualifications of any companies themselves for the intended purpose. This Guide is provided in disk format to be added to over time and updated by the user. The Guide should be update on a regular basis by the user for the greatest utility. Any individual copy is likely to have been altered from the original form.









## Introduction

This Planning Guide is intended to assist school administrators in Ohio in their efforts to maintain a safe and healthful school atmosphere, protect the environment, and meet their regulatory responsibilities. The Guide should be particularly useful as a planning tool for renovation, construction, demolition, facilities development, and school planning.

This Guide can be inserted in a three ring binder format as a hard copy reference, but the Guide itself is intended to be disk-based (Microsoft Word 2000), so that it can be loaded onto your computer. The Guide is presented in a web based format, with "clickable" web site links that will allow you to easily access the extensive world of web resources in the environmental health and safety area. Although these links will undoubtedly need updated in the future, many web sites now have forwarding site addresses and search capabilities that will allow one to easily update links as they are revised and replaced over time. The advantage of having updated regulations and current information at your fingertips on an on-going basis should far outweigh the effort expended in updating occasional outdated links. The computer version of the Guide is to be a "living document", to be personalized and updated as needed by you, and used throughout your career.

Environmental health and safety regulations are usually established at three levels: federal, state, and local. Generally, state regulations must be at least as stringent as federal, and local as stringent as state regulations. Many federal agencies allow state agencies to enforce regulations in their state (state primacy). For example, Ohio EPA has been given primacy for many federal environmental regulations in Ohio by US EPA. Sometimes states fill in regulatory "gaps" in federal regulations. One example is the Ohio State OSHA Regulations. State and local government employees are generally exempt from federal occupational safety and health (OSHA) regulations. Consequently, these employees, including school employees, where not protected by OSHA regulations. In the mid 90's the Ohio Legislature passed the Public Employees Risk Reduction Act (PERRA). This law adopted all federal OSHA regulations for Ohio state employees (usually called "State OSHA"). So in this manual OSHA web sites are used for these regulation citations (they apply to us, as Ohio public employers). Locally, we have local health department regulations, building codes, and the like. School administrators must deal with them all. This process is best started from the beginning, in the initial design of the new or renovated school building. Construction and renovation activities require various plan approvals and permits from some agencies as well.

In school planning, environmental health and safety aspects of the school environment are sometimes either overlooked or given low priority. This can create severe problems and expense later in the life of the building. My hope is that this Guide, and any consideration given to EHS issues that it may invoke, will make a valuable contribution to the health and safety of your school, the students and staff, your community, and the State of Ohio!

Chuck Hart
Athens,OH
10/27/01

**Accident Prevention**

The prevention of injuries is a very important aspect of school planning for administrators, students, visitors, and employees. Everything from the grounds, buildings, and procedures, to the consumer products used within the school environment are important issues. Accident prevention includes safety codes for building construction, employee safety at work, product recalls, permits for special events, and provisions for the public at community and sports events. Special events such as community festivals, musicals, fireworks, and the like may have to be considered as well. A policy and procedures should be established for the investigation, record keeping, and prevention of all injuries on school property. Record keeping is required for employee injuries under PERRA and must be posted in public in the District for the month of February each year. Certain aspects of accident prevention may affect your insurance policies and premiums. The Workers Compensation System (WC) must be accessed to process employee injuries on the job. A system of investigation, verification, and prevention of injuries and WC claims should be established. In depth accident investigations are necessary for proper WC claims decision making.

OSHA Occupational Safety Regulations
http://www.osha.gov/

OSHA Accident Reporting Requirements
http://www.osha-slc.gov/OshStd_toc/OSHA_Std_toc_1904.html

Ohio Public Employees Risk Reduction Program (PERRP) Information
http://198.234.41.214/w3/webpo.nsf?Opendatabase

PERRP Rules
http://onlinedocs.andersonpublishing.com/oac/home2.cfm?GRStructure1=4167&TextField=%3CJD%3A%224167%22%3E4167%20Public%20Employment%20Risk%20Reduction%20Advisory%20Commission

ODH Childhood Injury Prevention
http://www.odh.state.oh.us/odhprograms/childinj/childinj1.htm

ODH Consumer Product Safety
http://www.odh.state.oh.us/odhprograms/cpsaf/cpsafety1.htm

US Consumer Products Safety Commission
http://www.cpsc.gov/

Ohio Bureau of Worker Compensation
http://www.ohiobwc.com/

Electrical Safety Forum
http://www.electrical-safety.com/

Heat Stress
http://www.baesg.org/heatlist.htm

## Air Pollution

In Ohio, the Ohio EPA regulates air pollution. Most schools will have little to do with air pollution regulations. One exception is the Clean Air Act - National Elimination Standards for Hazardous Air Pollutants (NESHAPS) for Asbestos (covered in the Asbestos Section of this Guide). Another might be the permitting and operation of incinerators if the school has one. Open burning is prohibited in many locations (check local situation).

Ohio EPA Air Pollution Rules
http://www.epa.state.oh.us/dapc/regs/regs.html

Ohio EPA Incinerator Regulations
http://www.epa.state.oh.us/dsiwm/pages/incinpro.html

Ohio Open Burning Rules
http://onlinedocs.andersonpublishing.com/oac/home3.cfm?GRStructure1=3745&GRStructure2=3745%2D19&GRStructure3=&TextField=%3CJD%3A%223745%2D19%22%3EChapter%203745%2D19%20Open%20Burning%20Standards

**Animal Control**

Animals on school grounds should be discouraged by fencing or other appropriate means, because of the risk of bites, injuries, and disease transmission. Stray dogs, coyotes, skunks, raccoons, fox, and bats are a particular concern because of the risk of rabies. If a student is bitten, immediate medical attention is needed. The owner must quarantine biting domestic dogs and cats for 10 days. Wild animals should be sacrificed if possible for testing, as incubation periods are not reliable for quarantine. Do not try to capture them yourself, unless it is merely to close a gate or similar low risk actions. Call the animal warden. If the animal cannot be found for testing, the physician will need to know this. Contact your local Health Department immediately for advice.

Local Health Department Directory (Find your Local Health Department)
http://www.odh.state.oh.us/directory/lhd/lhd_list.htm

ODH Communicable Disease Rules / Rabies
http://www.odh.state.oh.us/Rules/Final/Chap3/FR3_lst.htm

Rabies Information
http://www.odh.state.oh.us/odhprograms/zoodis/rabies/geninfo/rab_geninf1.htm

Rabies Publications & Forms
http://www.odh.state.oh.us/odhprograms/zoodis/rabies/pubs/dwrab/dwrab1.htm

Ohio Animal Bite Summary
http://www.odh.state.oh.us/odhprograms/zoodis/abite/abite1.htm

Dog Bites
http://www.cdc.gov/safeusa/dogs/dogs.htm

**Art Rooms**

School art facilities can contain a myriad of health and safety concerns in painting, ceramics, photography, printmaking, sculpture, and other media. Many chemical art materials contain toxic metals, solvents, irritants, sensitizers, flammables, and other items of concern. The design of such facilities depends on the intended use and materials anticipated. Safety should be designed into the facility from the beginning, since one can rarely predict with accuracy the long-term curriculum needs of the art department. PERRA (Public Employees Risk Reduction Act – Ohio State OSHA) regulations apply to employees working in this and all areas of the school.

All art area ventilation systems should be designed to include exhaust ventilation (not return air). The area should be maintained under negative pressure in relation to adjoining areas. A qualified industrial engineer or mechanical engineer with contaminant control experience should be used to determine whether dilution ventilation is adequate or local exhaust ventilation is needed. Other features should include:

- Gas safety shut off and flame sensing devices for kilns
- All kilns (even electric one's) produce toxic fumes and vapors and should have local exhaust ventilation
- Safety shower/eyewash (especially for photography and kiln area's)
- Personal protective equipment should be supplied (gloves, eye protection) as needed
- A hand washing sink with soap and towels should be provided
- Appropriate storage area for combustible materials to avoid excessive fire load
- A flammable storage cabinet should be provided if flammable materials are used
- Flammable waste canisters should be provided if flammable materials are used on rags
- Backflow prevention on all sinks and hose bibs
- Ergonomic design for work tables, potters wheels, and graphic design tables
- Where ceramics and similar media are used, sinks should be equipped with clay traps

Arts, Crafts and Theatre Safety (ACTS)
http://www.caseweb.com/acts/index.htmInternet

Internet Resources for Art Hazards
http://www.library.unisa.edu.au/internet/pathfind/arthazards.htm

Kodak Photography MSDS's
http://www.kodak.com/country/US/en/corp/hse/prodSearchMSDS.shtml

Ilford Photography Environmental Health & Safety Page
http://www.ilford.com/html/us_english/msds/

The Ceramic Artists Guide to Raw Materials
http://www.claystation.com/tech/materials.html

Northwestern University Art Safety Guide
http://www2.mmlc.nwu.edu/art/safety/

**Asbestos**

The extensive regulatory requirements surrounding asbestos make it one of the most complex EHS topics in the school environment. Numerous federal, state, and local agencies have lengthy asbestos regulations. Although many commonly used asbestos materials were banned in the 70's, there are still certain types of asbestos products used today in the U.S. and it is used extensively in foreign countries. For that reason, all project specifications for new school facilities should state that "no asbestos containing materials are to be used". In addition, it is a good idea to submit a few samples of all newly installed, non-asbestos sprayed on insulation for asbestos analysis for confirmation. There have been reported cases of asbestos being removed, just to be replaced by another asbestos containing fireproofing. Poor quality asbestos abatement work could have also been covered up by non-asbestos fireproofing respray. Potential asbestos problems in existing schools to be renovated can be extensive and costly, especially in schools built in the 50's and 60's when spray on fireproofing was used extensively in school construction. Professional advice is recommended.

A summary statement about the intent of each law and appropriate web resources are presented below:

TSCA/AHERA – The Asbestos Hazard Emergency Response Act (AHERA)
Training a designated person for the District, school asbestos inspection and reports by accredited personnel, management plans, submission of management plans to ODH, 6 month surveys and 3-year re-inspections, employee training, notifications, and O&M programs

TSCA Summary
http://www.epa.gov/region5/defs/html/tsca.htm

TSCA AHERA
http://www4.law.cornell.edu/uscode/15/2641.html

TSCA AHERA Subpart 763
http://www.access.gpo.gov/nara/cfr/cfrhtml_00/Title_40/40cfr763_00.html

NESHAPS – Clean Air Act (CAA)
National Emission Standards for Hazardous Air Pollutants (NESHAPS), Subpart M-Asbestos Notification of EPA 10 days before asbestos removal renovations greater than or equal to 260 lineal ft., 160 sq. feet, or 35 cu. ft. (material off facility components), and all demolitions, asbestos air pollution prevention and waste disposal (Ohio has primacy).

CCA Summary
http://www.epa.gov/region5/defs/html/caa.htm

Asbestos NESHAPS
http://ecfr.access.gpo.gov/otcgi/cfr/otfilter.cgi?DB=3&query=40000000061&region=BIBSRT&action=view&SUBSET=SUBSET&FROM=1&SIZE=10&ITEM=1 - Sec. 61.140

Ohio EPA- NESHAPS
Notification of Ohio EPA 10 days before and fee payment for asbestos removal in renovations greater than or equal to 260 lineal ft., 160 sq. feet, and 35 cu. ft. and all demolitions, asbestos air pollution prevention and waste disposal. In Ohio local air agencies enforce these regulations. Usually these are the OEPA District Offices; however in some areas there is a local air agency such as in Cleveland, Montgomery Co., Lake-Geauga Co., etc.

http://onlinedocs.andersonpublishing.com/oac/home3.cfm?GRStructure1=3745&GRStructure2=3745%2D20&GRStructure3=&TextField=%3CJD%3A%223745%2D20%22%3EChapter%3745%2D20%20Asbestos%20Emission%20Control

OSHA – Asbestos Standard for General Industry
Worker protection in general industry (teachers and custodians), notifications of building occupants, annual 2-hour awareness training for custodians. PERRAC in Ohio schools.

http://www.osha-slc.gov/OshStd_data/1910_1001.html

OSHA – Asbestos Standard for Construction
Worker protection in construction and asbestos abatement (contractors and school maintenance asbestos workers). PERRAC in Ohio schools.

http://www.osha-slc.gov/OshStd_data/1926_1101.html

ODH – Ohio Dept. of Health Asbestos Rules
Notification of ODH for asbestos abatement projects over 50 lineal or sq. ft. and paying a fee. Licensing of abatement companies and asbestos evaluation specialists, contractor supervisors, project designers, air monitoring technicians, and workers.

ODH Asbestos Regulations
http://www.odh.state.oh.us/Rules/Final/Chap34/fr34_lst.htm

ODH Asbestos Program
http://www.odh.state.oh.us/ODHPrograms/Asbes1/asbestos1.htm

List of Ohio Certified Asbestos Specialists and Licensed Asbestos Companies
http://www.odh.state.oh.us/ODHPrograms/Asbes1/asblists.htm

DOT – Asbestos in Transportation
Labeling of waste bags and placarding of trucks transporting asbestos waste.
http://www.text-trieve.com/dotrspa/

**Bloodborne Pathogens & Infectious Waste Disposal**

The use of universal precautions and the development of the OSHA Bloodborne Pathogens Program under PERRA should be in place in the school. This may be developed in concert with the School Nurse and/or Local Health Department. Personal protective equipment (gloves) should be available for dealing with injuries and illness involving blood and other potentially infectious materials (OPIM). If infectious waste is generated, a means of safe and legal disposal may be necessary. In Ohio, we have state infectious waste regulations. They are enforced by Ohio EPA through the Local Health Department. Work with your School Nurse, Local Health Department, or hospital to develop disposal options.

OSHA Bloodborne Pathogens Standard
http://www.osha-slc.gov/OshStd_data/1910_1030.html

OSHA Bloodborne Pathogens Information
http://www.osha-slc.gov/SLTC/bloodbornepathogens/index.html

Ohio Infectious Waste Regulations
http://www.epa.state.oh.us/dsiwm/pages/3745-27.html

Ohio EPA Infectious Waste Program
http://www.epa.state.oh.us/dsiwm/pages/iwc.html

Ohio PERRAC Needle Stick Rules
http://198.234.41.214/w3/Needlestick.nsf

**Boiler Rooms**

Boiler rooms should generally be under a slight negative pressure in relations to other adjoining spaces to prevent odors, carbon monoxide, and other potential exposures in the school. Exhaust air (not return air) should be used in the boiler room area HVAC system. This must not however be allowed to affect pilot lights and furnaces. The maintenance office should not be located in the boiler room, but if it is, it should be under positive pressure to the boiler room and have a closing door. Excessive noise should be controlled. Boiler rooms should not be used for storage of combustible materials, flammable, or chemicals. Renovated boiler rooms should be surveyed for asbestos in the room and within the boiler itself. Boiler room asbestos abatements can be very expensive and take a long time. Boilers must meet state boiler inspection criteria.

State Boiler Information, Operator Licensing, and Regulations
http://www.com.state.oh.us/ODOC/dic/dicboilers.htm

Ohio Dept. of Commerce
http://www.com.state.oh.us/odoc/default.htm

**Building Code**

Buildings in Ohio must conform to the permit requirements, building codes, and regulations of the Ohio Basic Building Code (OBBC). This includes construction requirements, electrical, elevators, plumbing, and other aspects of the building project.

Your local building authority: _____

Ohio Basic Building Code (OBBC)
http://www.com.state.oh.us/ODOC/dic/app/dicbbs7002.pdf
http://www.com.state.oh.us/ODOC/dic/diclaws.htm#constr

Ohio Dept. Of Commerce Building Compliance
http://www.com.state.oh.us/ODOC/dic/DICINSPECTIONS.htm

Ohio Plumbing Inspection
(Many areas have local plumbing regulations through the Health Dept. or Building Dept. also.)
http://www.com.state.oh.us/ODOC/dic/dicplumbing.htm

Building Officials & Code Administrators International (BOCA)
http://www.bocai.org/

**Chemical Use**

Many chemicals have dangerous properties that can cause injury or make people ill. These include acid and base burns, irritations, sensitization, toxicity, carcinogenicity, mutagenicity, teratogenicity, and the like. Chemicals can and must be used properly and safely. Select and use all chemicals with care. The material safety data sheet (MSDS) is a critical piece of information on a chemical product. This information is available to you by law for all chemicals used in the school. Typically you can get one from your chemical supplier. Many chemical manufacturers have their MSDS's on the web now. The OSHA Hazard Communication Standard requires that you have an inventory of all chemicals and MSDS's for all your chemical products (except those that are exempt). Training and use of PPE is also very important. In planning a new school or renovation, adequate storage space must be provided for chemical storage with sturdy shelving preferably with edging to prevent bottles from falling. This area should be maintained under negative pressure with adequate exhaust (not return) air ventilations. The storage area should be lockable. The storage of lab chemicals or flammables is a special case. Obtain advices from an EHS or Lab safety specialist.

A summary of chemical hazards to workers, ILO
http://www.itcilo.it/english/actrav/telearn/osh/kemi/scan/sandh1.htm

OSHA Hazard Communication Standard
http://www.osha-slc.gov/OshStd_data/1910_1200.html

Cleaning Companies have MSDS and safe use information, such as:
Hillyard Cleaning Products
http://www.hillyard.com/

ASDTR Tox Facts (information about select chemicals)
http://www.atsdr.cdc.gov/toxfaq.html

ChemFinder Search
http://chemfinder.cambridgesoft.com/

MSDS Search
http://www.msdssearch.com/About%20UsN.htm

## Cleaning & Disinfection

Cleaning and disinfection are important to a sanitary school environment. Although regular soap and water are acceptable for most surfaces, some may require special disinfection. These may include school nurse exam tables, bathroom fixtures, showers, wrestling mats, blood clean up, and the like. Surfaces must be adequately cleaned before disinfection is attempted. Sufficient contact time for the disinfectant to be in contact with the surface must be maintained. Some cleaners and sanitizers require a clear rinse between cleaning and sanitization steps. The USEPA provides a list of acceptable disinfectants for various purposes. Special cleaning and restoration services may be needed after a flood or other major building problem.

USEPA Approved Disinfectants
http://ace.orst.edu/info/nain/lists.htm

National Antimicrobial Information Network (NAIN)
http://ace.orst.edu/info/nain/

Association of Professional in Infection Control
http://www.apic.org/

Sanitation Connection
http://www.sanicon.net/

Institute of Inspection, Cleaning, and Restoration Certification
http://www.iicrc.org/

Smoke, water, fire damage clean up companies, for example:

BMS CAT
http://www.bmscat.com/index_back_3.html

**Communicable Disease Control**

Communicable Disease control is a critical issue in school health. Health policies, immunization requirements, disinfection, building HVAC systems, sanitation, vector control, and education all play an important role in preventing the transmission of disease in the school environment. The School Nurse and Local Health Department should be consulted. State laws will regulate notifications and disease reporting.

Center for Disease Control and Prevention (CDC)
http://www.cdc.gov

CDC Adolescent and School Health
http://www.cdc.gov/nccdphp/dash/ataglanc.htm

Ohio Dept. of Health
http://www.odh.state.oh.us/odh_home.html

Local Health Department Directory (Find your Local Health Department)
http://www.odh.state.oh.us/directory/lhd/lhd_list.htm

Ohio Infectious Disease Manual
http://www.odh.state.oh.us/Resources/publications/IDCManual/ID_Intro.htm

Ohio Communicable Disease Rules
http://www.odh.state.oh.us/Rules/Final/Chap3/FR3_lst.htm

ODH Child Health
http://www.odh.state.oh.us/ODHPrograms/Topics/childhlth.htm

ODH Health Education
http://www.odh.state.oh.us/ODHPrograms/Topics/Healthed.htm

Ohio School Health Rules
http://www.odh.state.oh.us/rules/final/chap36/Fr36_19.PDF

MSDS's for Biological Agents
http://www.hc-sc.gc.ca/hpb/lcdc/biosafty/msds/index.html

**Emergency & Natural Disaster Planning**

Schools must be prepared for emergencies, both man-made and natural. This may include everything from fire, bomb scares, medical emergencies, poisonings, natural disaster, severe weather, terrorism, and violence. Procedures should be in place for emergencies, disasters, evacuations, lock downs, etc. Recently, bioterrorism has become a concern in the U.S. as well. These events should be considered in school facility planning. For example:

- Classroom door locks
- Emergency notification and communication systems
- Police, Fire, and EMS access
- Alarms
- Severe weather shelters or areas
- Evacuation routes
- Emergency medical care and first aid
- Handicap routes and assistance
- Equipment storage or access
- Tornado resistant construction
- Lightning rods and damage prevention
- State and local emergency response plans

Your Local Police Department: _____

Your Local EMS: _____

Your Local Fire Department: _____

The National Weather Service
http://www.wrh.noaa.gov/wrhq/nwspage.html

American Red Cross
http://www.redcross.org

Red Cross Fire Aid & Safety Services
http://www.redcross.org/services/hss/

Red Cross First Aid Kits
http://www.redcross.org/services/hss/lifeline/fakit.html

Red Cross School Safety Kits
http://www.redcross.quinstreet.com/storefront/kits_school.jsp

Red Cross Terrorism Preparedness
http://www.redcross.org/services/disaster/keepsafe/unexpected.html

ODH Disaster Preparedness Documents
http://www.odh.state.oh.us/odhprograms/disprep/dp_docs.htm

ODH Flood Disaster Guidelines
http://www.odh.state.oh.us/ODHPrograms/DisPrep/DP_facts/FloodManual.pdf

Federal Emergency Management Agency (FEMA)
http://www.fema.gov

Ohio EPA Emergency Response
http://www.epa.state.oh.us/derr/derrmain.html

Ohio Emergency Management Agency (OEMA)
http://www.state.oh.us/odps/division/ema/

National Disaster Resources
http://www.cdc.gov/safeusa/disaster-resources.htm

School Violence Bibliography
http://www.keepschoolssafe.org/biblio.htm

CDC Bioterrorism Site
http://www.bt.cdc.gov

ODH Bioterrorism Documents
http://www.odh.state.oh.us/Alerts/bio_t/biot1.htm

APIC Bioterrorism Site
http://www.apic.org/bioterror/

**Environmental & Natural Area's Outdoors**

Many school systems now have outdoor environmental labs, natural areas, wetlands, greenhouses, and ponds. Safety precautions should be in place to guard against unsupervised activities, water injuries, animal bites, vector-borne disease, poisonous plants, and the like. Consider the need for:

- boat or ring buoy if there is a pond or lake
- insect repellent and control of mosquito breeding sites
- possible presence of biting animals
- bee sting kits for allergic students
- emergency communications capabilities if the area is far from the school
- identifying and restricting poisonous plants like poison ivy from main student trails and area's
- controlling unsupervised activities and after hours use

Ohio Dept. of Natural Resources
http://www.dnr.state.oh.us/

U.S. Dept. of the Interior
http://www.doi.gov/index.html

National Outdoor Leadership School
http://www.nols.edu/nolshome.htmOhio

USEPA, Environmental education resources for teachers and students
http://www.epa.gov/epahome/educational.htm

Ohio EPA, Office of Environmental Education
http://www.epa.state.oh.us/other/oeef/oeemain.html

National Greenhouse Manufacturers Association
http://www.ngma.com/

Poisonous Plants
http://www.vth.colostate.edu/poisonous_plants/
http://www.ansci.cornell.edu/plants/plants.html

Red Cross Water Safety
http://www.redcross.org/services/hss/tips/healthtips/safetywater.html#lakes

## Ergonomics

Ergonomics is fast becoming one of the most critical issues in employee health and safety. Musculoskeletal injuries, cumulative trauma disorders (CTD), and the like are among the top workplace injuries and contribute to excessive Workers Comp payouts. These will likely be the most costly types of injuries for school districts in the future. Many non-work related risk factors increase the likelihood of CTD's as well. Ergonomic design is very important in designing jobs, workstations, computer labs, office computers, studios, lighting, and other school facilities. This should be taken into consideration in renovations, workstation design, and furniture purchasing.

OSHA Ergonomics Information
http://www.osha-slc.gov/SLTC/ergonomics

OSHA Computer Workstation Information
http://www.osha-slc.gov/SLTC/computerworkstation/index.html

BWC Ergonomics Consultants
http://www.ohiobwc.com/employer/programs/safety/Ergonomics.asp

Internet Ergonomics Sites
http://www.ohiobwc.com/employer/programs/safety/ErgonomicLinks.asp

Carpel Tunnel System (CTS) Homepage
http://www.ctsplace.com/

CDC Ergonomics Site
http://www.cdc.gov/od/ohs/Ergonomics/Ergohome.htm

**Fire**

Fire safety is a critical issue in school planning. Ohio Fire Code compliance is a minimum. Sprinkler systems, alarms, and other equipment are usually specified by code. It is often a good idea to consider a higher-level fire safety protection than required by code, as fire is one of the most serious and potentially devastating threats in every day life and has a very high property loss potential. Egress, panic hardware on doors, and evacuation routes should be planned for easy and quick evacuation in an emergency. Safe outdoor meeting sites should be available for assembly after an evacuation. Fire safety equipment must be inspected and maintained on a continuous basis. Equipment or stored items must not block equipment. Fire lanes must be established outdoors for emergency vehicle access.

Find your Local Fire Department
http://www.com.state.oh.us/ODOC/sfm/pub/fddir2000.pdf

Ohio State Fire Marshals Office
http://www.com.state.oh.us/ODOC/sfm/default.htm

Ohio Fire Laws
http://www.com.state.oh.us/ODOC/sfm/ohiofirelaw.htm

National Fire Protection Association (NFPA)
http://www.nfpa.org/

NFPA Fire & Burn Prevention
http://www.nfpa.org/education/Professional_Educators/RW/parent_fireburn.html

Fire Prevention for Kids
http://www.sparky.org/index.html

**Foodservice Operations**

Food borne illness is a risk whenever food is served to large groups. Excellent sanitation and worker training is needed by the School District. Ohio law regulates and licenses Foodservice Operations. Any new or renovated Foodservice Operations are required to submit plans to the Local Health Department in your Health District for approval prior to construction and licensing. All vending locations must be approved and licensed as well. Some Health Districts had Food Establishment Rules for grocery and carryout type food operations. Recently, various food laws were consolidated in Ohio under the Uniform Food Code.

ODH Food Safety Staff
http://www.odh.state.oh.us/odhprograms/food/foodstaf.htm

ODA Food Safety
http://www.state.oh.us/agr/FoodSafetyDiv.HTML

ODA Retail Food Rules
http://www.state.oh.us/agr/3717-ORC.pdf

Ohio Foodservice Rules
http://www.odh.state.oh.us/Rules/Final/Chap21/FR21_1st.htm

Ohio Uniform Food Safety Code
http://www.odh.state.oh.us/Rules/Final/Chap3717_1/Fr3717_1_lst.htm

CDC Food borne Illness Information
http://www.cdc.gov/health/foodill.htm

CDC Food Safety Information
http://www.cdc.gov/foodsafety

U.S. Food & Drug Administration (FDA)
http://www.fda.gov/

**Gym and Locker Rooms**

Gymnasiums should be well ventilated. Ceiling hung lights should have shatter resistant light shields. Noise dampening materials may be needed to control noise if the facility is also used for performing arts. Sprayed on fire proofing on the ceilings and beams should be covered to prevent falling material and damage from sport activities and balls. If HVAC condensation is not controlled it can present a slip hazard on the sports floors. Humidity control may be needed and ducts should only be externally insulated. Adequate aisles and bleacher railings should be provided. Padded wall coverings should be provided under the basketball goals if stopping distance is not adequate.

Locker rooms should be well ventilated with adequate exhaust capacity. Slip resistant floor materials such as grit coating or other materials should be considered. Locker rooms should be cleaned and disinfected daily when in use. Appropriate fungicidal disinfectants should be used on the floors and locker room benches. If whirlpool units are provided in athletic locker rooms they must meet the Ohio Swimming Pool and Spa Regulations.

USEPA Approved Disinfectants
http://ace.orst.edu/info/nain/lists.htm

There are many slip resistant flooring companies, for example:
http://www.slipfix.com/

**Hazardous Waste**

Chemical waste may be regulated as hazardous waste under the Resource Conservation and Recovery Act (RCRA). Hazardous waste may be generated in the laboratory, art room, photography, from pesticide use, bus garages and maintenance, boiler rooms, from cleaning materials, and the like. Labs should have a good chemical inventory and chemicals should not be allowed to get old and sit around on the shelves for years. Serious chemical waste hazards have been found in high schools, such as explosive picric acid and old ethers. Seek professional help. These may have to be removed by the bomb squad and should not be touched. Use safer chemicals and microscale chemistry to design curriculum.

RCRA Summary
http://www.epa.gov/region5/defs/html/rcra.htm

RCRA Regulations
http://www4.law.cornell.edu/uscode/42/ch82.html

RCRA Hazardous Waste Regulations
http://www4.law.cornell.edu/uscode/42/6921.html

Ohio EPA Rules
http://onlinedocs.andersonpublishing.com/oac/home2.cfm?GRStructure1=3745&TextField=%3CJD%3A%223745%22%3E%3CQL%3AQuery%2C%22%5Bgroup%20%273745%27%5D%22%2CRH%3E3745%20Environmental%20Protection%20Agency%20%2D%20Administration%20and%20Director%3CEL%3E

Ohio EPA, Hazardous Waste Rules
http://onlinedocs.andersonpublishing.com/oac/home3.cfm?GRStructure1=3745&GRStructure2=3745%2D50&GRStructure3=&TextField=%3CJD%3A%223745%2D50%22%3EChapter%3745%2D50%20Hazardous%20Waste%20Management%20System%96General

Ohio EPA, Division of Hazardous Waste Management
http://www.epa.state.oh.us/dhwm/welcome.html

**Indoor Air Quality (IAQ) & Ventilation (HVAC)**

IAQ problems are among the most problematic for many schools because they are often difficult to investigate or prove and create public relations problems. IAQ problems can be avoided by proper initial design of the building HVAC system and good long-term preventive maintenance. Many companies are now testing furniture and products and developing low emission products. There are many recommendations that can be made to include things that are often absent or deficient in HVAC systems designed for buildings. These include:

Exhaust air (not return air) for copier rooms, art rooms, custodial chemical storage areas, etc.
Duct clean-out doors on ductwork
Easily accessible filter boxes, drip pans, and floor drains
Better distribution louver positioning
Prevention of short-circuiting from supply air to return, due to poor positioning
Prevention of airflow problems, due to cubicle installation or other changes after initial design
Use of local exhaust ventilation where needed
Avoid using dilution ventilation where local exhaust ventilation is needed
Do not use internal fiberglass or other duct lining
Use higher efficiency filters and make sure they fit tightly in the filter frames
Restrict sources of contaminants too close to building air intakes
Avoid re-entrainment of contaminants because prevailing wind directions not considered
Keep bus and vehicle loading areas away from building air intakes
Keep boiler rooms under a slight negative pressure
Use moisture barriers where needed
Avoid flat roofs
Purchase low emission furniture, building materials, and products when available
Prevent condensation
Prevent flooding with properly developed sewers and floor drains were needed
Provide humidity control in the HVAC system

USEPA, Indoor Air Quality Program
http://www.epa.gov/iaq/

EPA Mold Remediation in Schools
http://www.epa.gov/iaq/molds/

EPA Children's Health
http://www.epa.gov/children/

ODH IEQ Program
http://www.odh.state.oh.us/odhprograms/indoor/indoor1.htm

American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE)
http://www.ashrae.org/

AERIES
http://www.aerias.org/

Air Quality Sciences (AQS)
http://www.aqs.com/

AQS Greenguard program
http://www.greenguard.org/

Aerotech Labs
http://www.aerotechlabs.com/

Aerotech IAQ Glossary
http://www.aerotechlabs.com/library.htm

Pure Air Control Services
http://www.pureaircontrols.com/

Carbon Monoxide Information
http://www.extension.iastate.edu/Pages/communications/CO/

International Society for Indoor Air Quality (ISIAQ)
http://www.ie.dtu.dk/isiaq/

American Indoor Air Quality Council (AIAQC)
http://iaqcouncil.org/

Pathcon Laboratories
http://www.pathcon.com

OSHA IAQ Investigations
http://www.osha-slc.gov/dts/osta/otm/otm_iii/otm_iii_2.html

**Insect, Rodent Control and Pesticide Use**

Many schools have occasional problems with insect and rodent pests and the need to kill weeds. This is necessary not only from an aesthetic point of view, but also for disease and injury prevention. Pests transmit diseases, transport insect vectors, contaminate food, and destroy property. Excessive weed growth can create disease vector habitat, increase littering, support poisonous plant growth, and increase physical safety risks. Pests need food, water, and shelter (habitat). You can control pests by controlling and removing these things.

There is no substitute for good basic sanitation and maintenance! Clean and well-maintained property does not support pests. The design of buildings is also important. Rodent proof building foundation flashing, proper window and door screens, louver screens, attic screens, and dumpster area design all contribute to a safe and healthful school environment. Dumpster areas should have containers with tight fitting lids, a concrete pad with a drain, and fencing. Recycling materials is a frequent cause of pest problems due to food scraps left in boxes and sugar residue in pop containers. Educate participants and control these problems in recycling areas. If mosquito control is needed contact your Local Health Department for advise.

When pest control is needed, an Integrated Pest Management (IPM) Program should be used. Always use pesticides as a last resort or adjunct to proper sanitation, building design, and non-chemical means if possible. Choose the safest pesticides possible. Make sure that the pest program staff are qualified and educated. In Ohio, an Ohio Pesticide Applicators license is required for restricted use pesticides. If pesticides are stored on the school site an adequate storage area must be provided and kept locked.

EPA Integrated Pest Management (IPM) in Schools
http://www.epa.gov/pesticides/ipm/

Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)
http://www4.law.cornell.edu/uscode/7/ch6.html

OSU Mosquito Information & Prevention
http://ohioline.osu.edu/hyg-fact/2000/2058.html

Insect Identification and Zoonotic Disease
http://www.odh.state.oh.us/odhprograms/zoodis/vbdp/vb_dref.htm

Ohio Dept. of Agriculture
http://www.ohio.gov/agr/

ODA Pesticide License Application Form
http://www.state.oh.us/agr/PRLicApp.pdf

Pesticide Safety Training Education Institute
http://psei.ext.vt.edu/

CDC Rodent Control Information
http://www.cdc.gov/nceh/ehserv/EHSA/hottopics/RodentControl.htm

**Laboratory Safety**

Laboratories within the school environment should be designed with the help of a qualified EHS or lab safety consultant. Some planners are unfamiliar with lab safety concepts and modern design principles. They may place greater priority on aesthetics and economics than safety because of this. Often building owners try to build special facilities like labs that tend to be expensive, without the financial ability to equip them safely and properly, and end up cutting corners. These situations should be avoided. Get advice from professionals with lab safety experience and do it right the first time!

Labs where chemicals are to be use should consider the curriculum and their likely needs before the design phase. Appropriate lab exhaust ventilation, fume hoods, lab differential pressure, utilities, fire prevention needs, storage areas, and the like should be considered. A safety shower and eyewash should be provided. Bottle eyewashes are not generally recommended. Specialty labs should receive specific consideration based on the materials to be used and likely risks. School employees (science teachers) may be required to have a written and implemented Chemical Hygiene Plan (CHP) per OSHA if they are involved in "the laboratory use of hazardous chemicals". These teachers should be trained on the safety equipment and their testing and maintenance needs. Fume hoods, safety showers, and eyewashes must be tested regularly.

OSHA Chemical Hygiene Standard
http://www.osha-slc.gov/OshStd_data/1910_1450.html

Ohio ORC Eye Protection Rules for Shops, Vocational Schools, and Labs
http://onlinedocs.andersonpublishing.com/revisedcode/home3.cfm?GRDescription1=revised%20code&GRDescription2=title%2033&GRDescription3=&TextField=%3CJD%3A%223313%22%3ECHAPTER%203313%3A%20BOARDS%20OF%20EDUCATION&GRStructure1=3313&GRStructure2=

The Laboratory Safety Institute
http://www.labsafety.org/index.html

Northwestern University, Fume Hood Handbook
http://www.acns.nwu.edu/research-safety/labsafe/hoods/index.htm

EPA Management Guide for Small Laboratories
http://www.epa.gov/ormisbo1/labguide.htm

EPA Green Chemistry Program
http://www.epa.gov/opptintr/greenchemistry/

National Microscale Chemistry Center
http://www.silvertech.com/microscale/

National Association of Chemical Hygiene Officers (NACHO)
http://www.labsafety.org/nacho.htm

CDC Biosafety in Microbiological & Biomedical Laboratories
(It is recommended that schools use non-pathogenic or benign (BSL1) organisms for basic microbiology classes. Agents listed in this reference at the Biosafety Levels 2 or above are not recommended for use in schools by students).
http://www.cdc.gov/od/ohs/biosfty/bmbl4/bmbl4toc.htm

Cylinder companies, such as:
Matheson:
http://www.mathesongas.com/

Chemical companies, such as:

| | |
|---|---|
| VWR | http://www.vwr.com/English/index.htm |
| Sigma-Aldrich | http://www.sigma-aldrich.com/saws.nsf/Home?OpenFrameset |
| Mallinckrodt | http://www.mallinckrodt.com/ |

American Chemical Society, ChemCenter
http://www.chemcenter.org/

## Lead

Lead is a toxic metal found in older schools in water, ceramic glazes, and lead paint. Lead-free glazes are available and should be used. In new schools water system lead solder should not be a problem, nor should lead paint. It should however be specified in all project specifications that no lead containing products shall be used. In renovated schools, lead can be a significant problem, requiring abatement or more commonly lead OSHA precautions during renovation. This should be specified in all project specifications for all contractors and sub-contractors. OSHA General Industry or Construction Lead Standards will control depending on the work being done. This is usually an issue in painting, where old lead paint must be scraped in order to prepare the surface for new paint.

Any lead abatement work in Ohio involving homes or schools or daycares with children less than 6 years of age (a "structure") must comply with Ohio Dept. of Health Lead Rules. Licensed lead contractors and risk assessors are required to do certain lead related activities. In schools, this generally means kindergarten and daycare settings. Lead paint inspections at a school should be done according to current state of the art, which at this time is the HUD Lead Guidelines. If the school system rents, leases, or renovates certain types of housing and commercial buildings built before 1978, they may be subject to EPA/HUD Lead Notification Laws. EPA water regulations control lead levels in the water system. Lead is a rather complex regulatory field. Professional advice should be sought. Lead–free paint, solder, and other building materials should be required in all building and renovation specifications.

OSHA Lead Standard – General Industry
http://www.osha-slc.gov/OshStd_data/1910_1025.html

OSHA Lead Standard – Construction
http://www.osha-slc.gov/OshStd_data/1926_0062.html

Lead Substance Hazard Data Sheet
http://www.osha-slc.gov/OshStd_data/1926_0062_APP_A.html

EPA Lead Regulations
http://www4.law.cornell.edu/uscode/15/2681.html

EPA Lead in Your Drinking water
http://www.epa.gov/safewater/Pubs/lead1.html

EPA National Lead Information Center
http://www.epa.gov/lead/nlic.htm

EPA Testing for Lead
http://www.epa.gov/lead/leadtest.pdf

Ohio EPA Lead in Water Rules
http://onlinedocs.andersonpublishing.com/oac/home3.cfm?GRStructure1=3745&GRStructure2=3745%2D81&GRStructure3=&TextField=%3CJD%3A%223745%2D81%22%3EChapter%203745%2D81%20Primary%20Drinking%20Water%20Rules

CDC Childhood Lead Program
http://www.cdc.gov/nceh/lead/lead.htm

HUD Lead Program
http://www.hud.gov/offices/lead/

HUD Lead Disclosure Regulations
http://www.hud.gov/offices/lead/disclosurerule.cfm

Finding lead professionals:
Nationally http://www.leadlisting.org/
In Ohio http://www.odh.state.oh.us/ODHPrograms/LP_PREV/lp_list1.htm

ODH Childhood Lead Program
http://www.odh.state.oh.us/odhprograms/lead_ch/leadch1.htm

ODH Lead Poisoning Prevention Program
http://www.odh.state.oh.us/ODHPrograms/LP_PREV/lp_prev1.htm

ODH Lead Rules
http://www.odh.state.oh.us/Rules/Final/Chap32/Fr32_lst.htm

ODH Lead Frequently Asked Questions
http://www.odh.state.oh.us/odhprograms/lp_prev/lp_faqs/hown.htm

**Lighting**

School lighting should meet building code requirements and recommendations of professional organizations. The intensity of visual tasks such as reading, office work, and computer use make this issue ever more important. Fluorescent lighting in the past contained PCB ballasts and mercury in the bulbs. They may require special handling as hazardous waste when disposed of. In school planning, consider adequate outdoor lighting around the school for safety and security after dark.

Edison Electric Institute
**http://www.eei.org/**

Illuminating Engineering Society of North America
http://www.iesna.org/

Lighting Industry Links
http://naild.org/links/industry/banner.html

CDC, Computer Lighting
http://www.cdc.gov/od/ohs/Ergonomics/compergo.htm#LIGHTING

**Noise**

High noise levels are not conducive to a learning environment. This should be taken into consideration when siting a new school property. Such things as airports, high traffic area, entertainment areas, industrial sites, sports stadium, and any other high noise areas should be avoided. High noise areas within or near the school can be the gym, sports stadiums, music room, shop, vocational education, cafeteria, and student lounges. Employees must comply with the OSHA Noise Standard. Employees exposed to greater than 85 dBA must be in a Hearing Conservation Program and noise over 90 dBA must be controlled. This can be a problem in mechanical areas, shops, cafeteria dish rooms, and grounds keeping operations.

OSHA Hearing Conservation Standard
http://www.osha-slc.gov/OshStd_data/1910_0095.html

NIOSH Hearing Loss Prevention
http://www.cdc.gov/niosh/noise/noisepg.html

NIOSH Compendium of Hearing Protection Devices
http://www.cdc.gov/niosh/95-105.html?

EPA Noise Abatement Programs
http://www.epa.gov/docs/epacfr40/chapt-I.info/subch-G.htm

National Hearing Conservation Association
http://www.hearingconservation.org/

Noise Control and Acoustics companies, for example:
Noise Suppression Technologies
http://www.noisesuppression.com/

Hearing Protection Equipment companies, for example:
Howard Leight
http://www.howardleight.com/

**PCB's**

Polychlorinated Biphenyls (PCB) are a class of chemicals that were used in transformers, electric equipment, light ballasts, and other devices. Although banned around 1979, this substance still exists in many products and devices. Potential health effects caused EPA to regulate their use. The responsibility for compliance is based on who owns the equipment. Administrators need to determine whether the electric company or the School District owns transformers or other equipment. If they belong to the School District, EHS consultation may be needed.

PCB Chemical Hazard Information
http://www.atsdr.cdc.gov/tfacts17.html

EPA PCB regulations
http://www.access.gpo.gov/nara/cfr/cfrhtml_00/Title_40/40cfr761_00.html

Ohio EPA PCB Program
http://www.epa.state.oh.us/derr/cepps/cepps.html#PCB

**Personal Protective Equipment (PPE)**

Personal protective equipment (PPE) is worn by employees and intended to be used to protect employees from health hazards. Forethought in school planning, in the form of proper ventilation, safety equipment, adequate storage, equipment guards, and chemical selection can reduce the need for PPE later. PPE includes eye protection, gloves, protective clothing, hearing protection, respirators and the like. A written PPE assessment is required and there are many requirements, especially for respirators.

OSHA PPE Standard
http://www.osha-slc.gov/OshStd_toc/OSHA_Std_toc_1910_SUBPART_I.html

OSHA Respiratory Protection Standard
http://www.osha-slc.gov/OshStd_data/1910_0134.html

Ohio ORC Eye Protection Rules for Shops, Vocational Schools, and Labs
http://onlinedocs.andersonpublishing.com/revisedcode/home3.cfm?GRDescription1=revised%20code&GRDescription2=title%2033&GRDescription3=&TextField=%3CJD%3A%223313%22%3ECHAPTER%203313%3A%20BOARDS%20OF%20EDUCATION&GRStructure1=3313&GRStructure2=

Glove selection (there are many glove companies, here are a few):
http://www.bestglove.com/
http://www.kappler.com/
http://www.mapaglove.com/content/industri.htm
http://www.ansell-edmont.com/us/html/home.asp

PPE Suppliers (there are many PPE suppliers, here are a few):
http://www.northsafety.com/home.htm
http://www.vallen.com/
http://www.labsafety.com/
http://www.msanet.com/

**Playgrounds**

Playgrounds are an important aspect of the elementary school environment. Safety by design is necessary whether purchasing equipment or building it, using parent groups or other volunteers. Equipment must be safe, surfacing must prevent injuries in case of a fall, and due consideration must be given to long-term maintenance problems. Surfacing is an especially important topic. Each surface material has pro's and con's and they must be weighted carefully in the selection. Any loose fill material like sand, tanbark, wood chips, smooth gravel, and the like must be maintained daily by the maintenance staff. This must be calculated in the long term cost along with the initial installation cost when comparing synthetic surfaces and other options that may require less maintenance. Most of these problems can be prevented by proper facilities planning. Common problems are:

Improper surfacing
Failure to inspect for foreign materials and rake loose fill surfacing daily
Tripping hazards cause by borders, railroad ties, and the like
Exposed bolts
Strangulation Hazards
Equipment too high
Improper railings
Insufficient circulation space
Mixed age occupancies
Lack of fencing
Failure to control traffic and parking lot separation
Metal equipment burns from high ambient temperatures in hot weather
Lead paint

CPSC Handbook for Playground Safety
http://www.cpsc.gov/cpscpub/pubs/325.pdf

CPSC Playground Safety Publications
http://www.cpsc.gov/CPSCPUB/PUBS/playpubs.html

Playground Safety
http://www.cdc.gov/safeusa/playgro/playgrou.htm

National Program for Playground Safety
http://www.uni.edu/playground/

CDC Playground Safety Information
http://www.cdc.gov/ncipc/factsheets/playgr.htm
http://cpsc.gov/cpscpub/pubs/playpubs.html

National Playground Safety Survey
http://pirg.org/reports/consumer/playground2000/index.html

NSC Is your child's playground safe?
http://www.nsc.org/pubs/fsh/archive/spr00/playgrnd.htm

There are many playground equipment and surfacing companies and consultants, for example:
http://www.safetysurface.com/
http://matfactoryinc.com
http://www.playlsi.com/
http://playgroundsafetyexpert.com/index2.ivnu

**Plumbing**

The State of Ohio has plumbing regulations for the installation or rough and finish plumbing. Plumbing regulations are often enforced at the local level, usually through permit systems from the Health or Building Department. Check your local situation.

Your local building/plumbing authority: _____

Ohio Dept. of Commerce, Plumbing & Backflow
http://www.com.state.oh.us/odoc/dic/dicplumbing.htm

Ohio Certified Plumbing Inspectors
http://www.com.state.oh.us/ODOC/dic/scripts/plumbqy.htm

**Property Purchase and Site Considerations**

The school site should be safe and free from recognized hazards. A level, well-drained site isolated from highways, railroads, mines, caves, bodies of water, industrial operations, environmental hazards, noise, and other potential risks are best. Ample space for school buildings, playing fields, playgrounds, parking, vehicular traffic flow will be necessary.

Prior to any property purchases for schools, consideration should be given to the past uses of the site and any environmental liabilities it may have associated with it. A Phase 1-Environmental Audit should be done by a qualified company. This should be done whether or not the property has buildings on it. These audits are an investigation of the site history, records, regulatory record, permits, and other information along with a property walkover. ASTM E1527 or other acceptable specifications should be used. These audits generally cost only a few thousand dollars and can prevent great expense later. Liabilities such as excessive asbestos, UST's, landfills, dump sites, chemical contamination, and other hazards may be found. This can help you in your decision whether or not to buy the property or accept a property donation before you do it. This information can be used to negotiate the asking price down if liabilities are found that must be taken care of and you still want the property. Phase 1 audits can also be helpful in identifying wetlands, which may be a positive or negative factor depending on the area of the site and uses envisioned for the property.

Sites with information about land sites and pollution:
http://health-track.org/
http://www.hud.gov/emaps/
http://maps.epa.gov/enviromapper/
http://www.fnis.com/nmh.htm
http://www.scorecard.org/
http://www.mapcruzin.com/global_toxmaps.htm

American Society for Testing & Material (ASTM) Standards
http://www.astm.org/

ASTM Environmental Site Assessment Standards
http://www.astm.org/DATABASE.CART/PAGES/E1527.htm
http://www.astm.org/DATABASE.CART/PAGES/E1528.htm

EPA Wetlands Information
http://www.epa.gov/OWOW/wetlands/index.html

**Public Employees Risk Reduction Act (State of Ohio OSHA)**

The Ohio Public Employees Risk Reduction Act (PERRA) was initiated in December 1992 with the passage of Ohio HB 308. It was intended to protect Ohio Public Employees (State and Local employees, including School Districts) from occupational injuries and illness on the job. Public employees are exempt from federal OSHA protection and this law fills this gap. The Ohio Public Employees Risk Reduction Program (PERRP) is commonly called "State Employees OSHA". The program is complaint driven and routine inspections are not generally done by the Dept. of Commerce, Bureau of Occupational Safety & Health, who enforce the program in Ohio. The actual technical regulations are the same as federal OSHA, which were adopted in total. These are a minimum. The PERRP can and have adopted some more stringent regulations as well. All public employers must post the PERRP poster.

PERRP Rules
http://onlinedocs.andersonpublishing.com/oac/home2.cfm?GRStructure1=4167&TextField=%3CJD%3A%224167%22%3E4167%20Public%20Employment%20Risk%20Reduction%20Advisory%20Commission

PERRP Program
http://198.234.41.214/w3/webpo.nsf?Opendatabase

Get a PERRP Poster
http://198.234.41.214/w3/webpo.nsf?Opendatabase

Free consultation
http://198.234.41.214/w3/webpo.nsf?Opendatabase

Division of Safety & Hygiene Rules
http://onlinedocs.andersonpublishing.com/oac/home2.cfm?GRStructure1=4121%3A1&TextField=%3CJD%3A%224121%3A1%22%3E4121%3A1%20Division%20of%20Safety%20and%20Hygiene

OSHA Regulations
http://www.osha.gov/

National Institute of Occupational Safety & Health (NIOSH)
http://www.cdc.gov/niosh/homepage.html

OSHA Topical Information
http://www.osha-slc.gov/SLTC/

**Radon**

Radon is a naturally occurring radioactive gas found in the earth that can seep into building structures. Radon is a lung carcinogen. US EPA recommends that annual exposure does not exceed 4 picocuries/L. In Ohio, radon testers and mitigators must be licensed by ODH.

ODH Radiation Program
http://www.odh.state.oh.us/odhprograms/envrad/envrad1.htm

ODH Radon Licensing
http://www.odh.state.oh.us/ODHPrograms/RADLIC/radon1.htm

Ohio Radon Testing Rules
http://www.odh.state.oh.us/Rules/Final/Chap69/Fr69_lst.htm

EPA Radon Information
http://www.epa.gov/iaq/radon/pubs/citguide.html

**School EHS Inspection**

State law requires that all schools be inspected twice per year by the Local Health Department. There are no specific inspection regulations. This same law allows the Board of Health to close a school for health reasons.

Ohio School Inspections Law
http://onlinedocs.andersonpublishing.com/revisedcode/home3.cfm?GRDescription1=revised%20code&GRDescription2=title%2037&GRDescription3=&TextField=%3CJD%3A%223707%22%3ECHAPTER%203707%3A%20BOARD%20OF%20HEALTH&GRStructure1=3707&GRStructure2=

**Sewage Disposal**

Schools that are not served by central sanitary sewerage systems (city sewers) will need to submit plans to Ohio EPA and obtain permits to build a package treatment plant or other approved sewage system. Plan ahead as this can take a long period of time. Ohio EPA regulates public and semi-public sewage in Ohio. Contact the OEPA District office in your area. Some Local Health Departments may contract with OEPA to do inspections locally. Local sanitarians will usually inspect semi-public sewage systems during routine school inspections.

Ohio EPA Sewage Rules
http://www.epa.state.oh.us/dsw/rules/index.html

OEPA Permit to Install Rules
http://www.epa.state.oh.us/dsw/rules/3745-31.html

Find your OEPA District Office
http://www.epa.state.oh.us/new/dist.html

**Special Events & Crowd Control**

All schools have special events attended by the community. Due consideration must be given to issues of vehicular traffic, crowd control, and emergency response. Some special events may necessitate special facilities, emergency equipment, or permits. The specific environmental health and safety planning needs will be determined by the type of function. Useful information can be found in other sections of this manual for emergency response and the like. Portable sanitary facilities should be rented from a reputable source and waste disposed of by a licensed septage hauler at an approved site. Contact your Local Health Department for advice.

Fireworks & Pyrotechnics
http://www.com.state.oh.us/ODOC/sfm/Pyromain.htm

**Sports & Athletic Fields**

Maintenance of athletic fields and related buildings is an important aspect of injury prevention. Bleachers should be in good repair and engineered to hold the weight of the intended maximum load plus a protection factor load. This must always be calculated and designed by an engineer or design professional as required. Frequent inspection is necessary for defects, wear, and old age.

Concession stands and restrooms must meet local building and health department regulations. Foodservice operations at the concessions must meet the same health regulations as the school and require plan approval in Ohio. An additional consideration is the fact that these stands are often built and manned by volunteers who are not trained in Ohio law, food sanitation, and food borne illness prevention. Since potentially hazardous foods are sometime served, such as chili for chili dogs and the like, consideration should be given to the risk of food borne illness and the associated liability under these circumstances. All food must be from approved sources and food products cannot be made at home and sold at the concession in Ohio.

Water supplies at the fields should be from potable sources and there should be no cross connections with non-potable systems. This is true for the drinking water fountains and field sprinkling and irrigation systems. Though the inclination to water fields from non-potable sources seems reasonable, there have been cases of disease transmission to athletes where non-potable systems have been cross connected with potable systems and used to sprinkle the field.

National Playing Fields Association
http://www.npfa.co.uk/new_frames.htm

SafeUSA, Sports and recreation safety for children
http://www.cdc.gov/safeusa/siteindex.htm

**Solid Waste & Recycling**

The solid waste (garbage) area for a school should be constructed on a concrete slab with a drain to facilitate cleaning. The area should be fenced to keep children out, with a gate to accommodate pick up. Since garbage areas are prone to insect, rodent, and odor problems, consideration should be given to prevention. Wood or other materials should not be stored in the area. The area should not be developed near a retaining wall or other natural rodent harborage area. The area should not be near the foodservice doors or any air intake for the building fresh air system. Room for adequate numbers of dumpsters should be provided to hold all solid waste generated between pick up's. All dumpsters should have closed, tight fitting lids and adequate warning labels on them. All solid waste should be able to be put in the dumpster and not on the ground between pick up's. Burning of solid waste would likely violate local open burning laws and ordinances (check local situation).

Recycling is very popular and contributes to environmental protection, resource reuse, and conservation. Problems can be created however, by recycling operations. Chief among these is the creation of insect and rodent problems from food scrapes left in boxes and pop residue in pop cans. School personnel must be educated about these problems and the need to dump all food scrapes and rinse pop cans out before depositing them in the recycle containers. Adequate recycling containers should be provided. They should be made of cleanable materials and cleaned on a regular schedule. Recycle areas should be kept clean and picked up regularly.

Ohio EPA, Construction and Demolition Debris Rules
http://onlinedocs.andersonpublishing.com/oac/home3.cfm?GRStructure1=3745&GRStructure2=3745%2D400&GRStructure3=&TextField=%3CJD%3A%223745%2D400%22%3EChapter%203745%2D400%20Disposal%20Methods%20for%20Construction%20and%20Demolition%20Debris%3B%20Licensed%20Facilities

Ohio Recycling Rules
http://onlinedocs.andersonpublishing.com/oac/home3.cfm?GRStructure1=3745&GRStructure2=3745%2D58&GRStructure3=&TextField=%3CJD%3A%223745%2D58%22%3EChapter%203745%2D58%20Recyclable%20Material%20Standards

Ohio EPA Recycling/Reduction
http://www.epa.state.oh.us/opp/oppmain.html

Recycling Information
http://www.epa.state.oh.us/opp/wastex.html

ODNR Office of Recycling & Litter Prevention
http://www.dnr.state.oh.us/recycling/

US EPA Kids Garbage & Recycling page
http://www.epa.gov/kids/garbage.htm

US EPA, Office of Solid Waste Kids Page
http://www.epa.gov/epaoswer/osw/kids.htm

US EPA, Frequently asked questions about waste
http://www.epa.gov/epaoswer/osw/basifact.htm

Top 100 Recycling Sites
http://www.100toprecyclingsites.com/

**Storage Area's**

Consideration should be given to adequate storage space for various items necessary for school maintenance and operations. This includes surplus chairs and tables, food supplies, cleaning chemical supplies, pesticides, boiler chemicals, and the like. Adequate space and aisles should be provided to safely store and retrieve items from the storage area. Food items must be separated and protected from chemical contamination. Area's where chemicals are stored or odors are created (such as athletic equipment) should be provided with exhaust (not return air) ventilation. Adequate lighting should be available in order to read labels and instructions. Area's where hazards may exist should be lockable and restricted from access by children. This includes custodial closets, chemical storage area, boiler rooms, laboratory chemical storage, and the like. Custodial closets should be provided with adequate, secured shelving units. Slop sinks provided for custodial activities should be floor base units to facilitate the dumping and filling of mop buckets without lifting. This will prevent back injuries and other ergonomic problems. Racks for the hanging of mops can sometimes be built that will drain into the floor base and not create wet floors and slip hazards. Faucets with hose bib connections must have back flow prevention.

**Swimming Pool**

Some high schools and facilities for the handicapped have swimming pools. In Ohio, swimming pool plans must be submitted to and approved by the State Health Department's Engineering Unit and the Local Health Department prior to construction. In many Health Districts, pools are licensed and inspected by the Local Health Department. Pools must have safe facilities and equipment, properly engineered water treatment systems, regular water chemistry testing, and properly trained staff.

CDC, Swimming Pool Health & Safety
http://www.cdc.gov/health/spsafety.htm

Ohio Swimming Pool Rules
http://www.odh.state.oh.us/Rules/Final/Chap31/fr31_lst.htm

ODH Swimming Pool Program
http://www.odh.state.oh.us/odhprograms/swim/swim1.htm

ODH Engineering Program (Pool Plan Submittals)
http://www.odh.state.oh.us/odhprograms/e_eng/envir1.htm

Water Safety
http://www.cdc.gov/safeusa/water/water.htm

Red Cross Swimming and Life Saving
http://www.redcross.org/services/hss/aquatics/

The Ohio Aquatics Council
http://www.aquaticcouncil.com/

National Pool & Spa Institute
http://www.nspi.org/

Certified Pool Operators Course
http://www.aquaticcouncil.com/training/index.html#Anchor-WHAT-62712

## Theatre and Stage

The design of theatre stages and related facilities is a specialty area where the school can benefit from appropriate consultation. Knowledgeable professionals should design theatre rigging and counter weight systems. Older stages to be remodeled are likely to have asbestos fire curtains. They may never have been rolled down and may be deteriorated. If they are rolled down without precautions, they can expose people to asbestos dust hazards. Safety in dark areas must be considered. Consideration should be given to space needed for set design. Electrical safety, ground fault protection, and adequate outlets must be provided to prevent temporary make shift electrical devices and over use of extension cords. Hazards may be created due to the sets being designed, materials used, and tools used.

Arts, Crafts, and Theatre Safety (ACTS)
http://www.caseweb.com/acts/index.html

There are many theatre design, rigging, and equipment firms, such as:
http://www.tiffinscenic.com/
http://www.cosler.com/
http://www.theatredesign.com/
http://www.sapsis-rigging.com/

Theatre Safety Sites
http://www.stagespecs.com/links/Safety/

Canadian Center for Safety in the Arts
http://web.idirect.com/~cnha/index.html

Georgia State University, Theatre Shop Safety Guide
http://www.gsu.edu/~wwwuth/Safety%20Guide.htm

**Underground Storage Tanks**

Underground storage tanks (UST) usually hold gasoline or fuel oil. If you have any, they are most likely located at the bus garage. The Resource Conservation and Recovery Act (RCRA) regulates UST's. In Ohio, enforcement is the responsibility of the State Fire Marshals Office, Bureau of Underground Storage Tank Regulation (BUSTR). UST's need to be registered with BUSTR and there are monitoring, removal, insurance, and other requirements.

EPA, RCRA/UST Regulations
http://www.access.gpo.gov/nara/cfr/cfrhtml_00/Title_40/40cfr280_00.html

Ohio Bureau of Underground Storage Tank Regulation (BUSTR)
https://www.com.state.oh.us/odoc/sfm/bustr/

Ohio UST Definitions
http://onlinedocs.andersonpublishing.com/revisedcode/text.cfm?GRDescription2=title%2037&GRDescription3=text%20of%20statute&GRStructure1=3737&GRStructure2=3737%2E87&TextField=%3CJD%3A%223737%2E87%22%3E%A7%203737%2E87%20Definitions%2E

Ohio UST Rules
https://www.com.state.oh.us/odoc/sfm/bustr/Download1999Rule.asp

Frequently asked questions about UST's
http://www.com.state.oh.us/ODOC/sfm/firefaq.htm#Explo

**Vehicular Traffic, Pedestrian & Bike Safety**

Control of traffic around the school is essential. Planning for vehicles, school bus pick up, visitors, parking, walkers, and bikes must be considered. Adequate space, routes, signage, fencing, vehicle barriers, and separation are needed. Vehicular traffic should be separated from main walking routes, building egress, and playgrounds. Consider concrete pillars near exit doors so that vehicles or equipment cannot block the exit doors. Fire lanes must be designed for easy access by emergency vehicles and not prone to blockage. Bus loading and idling areas should not be located near open doors, windows, or building air intakes. Crosswalks and signals should be designed by professionals and well marked. Bike racks should be located away from vehicle and bus areas. Parking areas should be away from playground and other locations frequented by children. Areas used for multiple purposes should be carefully planned and controlled.

Back to School Safety
http://www.nsc.org/mem/youth/8_school.htm

NSC Bus Safety
http://www.nsc.org/library/facts/schlbus.htm

NHTSA Bus Program
http://www.nhtsa.dot.gov/people/injury/buses/

Get to School Safely
http://www.ed.gov/pubs/parents/LearnPtnrs/safe.html

CPSC Kids Safety
http://www.cpsc.gov/kids/kidsafety/index.html

Bike Helmets
http://www.cpsc.gov/kids/kidsafety/correct.html

Walking Safely
http://www.cdc.gov/safeusa/walk/walking.htm

Bike Safety
http://www.cdc.gov/safeusa/bike/bike.htm

NFPA Bike and Pedestrian Safety
http://www.nfpa.org/education/Professional_Educators/RW/parent_bike.html

NFPA Motor Vehicle Safety
http://www.nfpa.org/education/Professional_Educators/RW/parent_vehicle.html

OSHA Motor Vehicle Safety Information
http://www.osha-slc.gov/SLTC/motorvehiclesafety/index.html

## Vocational, Shop, & Agricultural Education

The applicable environmental health and safety regulations for shops and vocational or agricultural education depend on the nature of the activities being undertaken or the kind of shop involved. Generally, many of the OSHA safety and health standards will apply. Equipment safety and personal protective equipment standards should be reviewed. In the design phase of new facilities this will be a very important issue. Ventilation, safety shower/eye washes, automatic shut offs, welding facilities, fire safety, paint spray booths, chemical storage, equipment guarding, and many other aspects of shop safety may be involved. Professional consultation is recommended.

Agricultural Education & Safety
http://www.usu.edu/~netref/Ag/aged.html

National Education Center for Agricultural Safety
http://nsc.org/necas.htm

The Safety Aspects of Machine Management
http://www.msstate.edu/dept/AgEdExp/4163/safety/index.htm

Ohio ORC Eye Protection Rules for Shops, Vocational Schools, and Labs
http://onlinedocs.andersonpublishing.com/revisedcode/home3.cfm?GRDescription1=revised%20code&GRDescription2=title%2033&GRDescription3=&TextField=%3CJD%3A%223313%22%3ECHAPTER%203313%3A%20BOARDS%20OF%20EDUCATION&GRStructure1=3313&GRStructure2=

OSHA
http://www.osha.gov/

OSHA Personal Protective Equipment Regulations
http://www.osha-slc.gov/OshStd_toc/OSHA_Std_toc_1910_SUBPART_I.htm

OSHA Personal Protective Equipment Information
http://www.osha-slc.gov/SLTC/personalprotectiveequipment/index.html

OSHA Agricultural Operations Information
http://www.osha-slc.gov/SLTC/agriculturaloperations/index.html

OSHA Auto Body Information
http://www.osha-slc.gov/SLTC/autobody/index.html

OSHA Welding & Cutting Information
http://www.osha-slc.gov/SLTC/constructionwelding/index.html

OSHA Machine Guarding Information
http://www.osha-slc.gov/SLTC/machineguarding/index.html

OSHA Power Transmission Information
http://www.osha-slc.gov/SLTC/powertransmission/index.html

OSHA Powered Industrial Truck (Forklift) Information
http://www.osha-slc.gov/SLTC/poweredindustrialtrucks/index.html

OSHA Spray Operations Information
http://www.osha-slc.gov/SLTC/sprayoperations/index.html

OSHA Trenching & Excavation Information
http://www.osha-slc.gov/SLTC/trenchingexcavation/index.html

OSHA Wood Dust Information
http://www.osha-slc.gov/SLTC/wooddust/index.html

**Water Supply**

Schools that are not served by central water systems (city water) will need to submit plans to Ohio EPA and obtain permits to build a semi-public water system. Plan ahead as this can take a long period of time. Ohio EPA regulates public and semi-public water in Ohio. Contact the OEPA District office in your area. Properly developed drilled wells usually provide the best source in area's where quantity is adequate. Some Local Health Departments may take water samples during routine school inspections. It is a good idea to do water samples several times a year. Bacteriological water samples for fecal coliform indicator organisms are available for minimal cost by contacting the Local Health Departments.

OEPA Water Well Rules (semi-public water systems)
http://onlinedocs.andersonpublishing.com/oac/home3.cfm?GRStructure1=3745&GRStructure2=3745%2D9&GRStructure3=&TextField=%3CJD%3A%223745%2D9%22%3EChapter%203745%2D9%20Water%20Well%20Standards

Find your OEPA District Office
http://www.epa.state.oh.us/new/dist.html

American Water Works Association, Ohio Chapter
http://www.ohiowater.org/oawwa/index.htm

ODNR, Water Resources
http://www.dnr.state.oh.us/odnr/water/

**Regulatory Agencies**

Local

Local Health Department Directory
http://www.odh.state.oh.us/directory/lhd/lhd_list.htm

Local Fire Department Directory
http://www.com.state.oh.us/ODOC/sfm/pub/fddir2000.pdf

State of Ohio

State of Ohio Agencies
http://www.state.oh.us/contacts.htm

Ohio Department of Health (ODH)
http://www.odh.state.oh.us/directory/directory1.html

Search for State Health Departments in Other States
http://www.cdc.gov/search2.htm

Ohio Bureau of Workers Compensation (BWC), Division of Safety & Hygiene
http://www.ohiobwc.com/employer/services/SafetyHygiene.asp

Ohio Dept. of Commerce
http://www.com.state.oh.us/ODOC/

Ohio Dept. of Transportation (ODOT)
http://www.dot.state.oh.us/

Ohio School Facilities Commission
http://www.osfc.state.oh.us/

Ohio State Fire Marshall
http://www.com.state.oh.us/ODOC/sfm/

Ohio EPA
http://www.epa.state.oh.us/

Ohio EPA, District Offices in Ohio
http://www.epa.state.oh.us/new/dist.html

Ohio Dept. of Agriculture (ODA) Divisions
http://www.state.oh.us/agr/divisionphonelist.htm

Ohio Emergency Response Agency
http://www.state.oh.us/odps/division/ema/

Federal

Occupational Safety & Health Administration (OSHA)
http://www.osha.gov/

National Institute for Occupational Safety & Health (NIOSH)
http://www.cdc.gov/niosh/homepage.html

Environmental Protection Agency (EPA)
http://www.epa.gov/

Environmental Protection Agency (EPA), Region 5 (includes Ohio)
http://www.epa.gov/region5/

Dept. of Health and Human Services (HHS)
http://www.os.dhhs.gov/

Centers for Disease Control & Prevention (CDC)
http://www.cdc.gov/

Dept. of Transportation (DOT)
http://www.dot.gov/

Federal Emergency Response Agency (FEMA)
http://www.fema.gov/

Federal Bureau of Investigation (FBI)
http://www2.fbi.gov/homepage.htm

Consumer Product Safety Commission (CPSC)
http://www.cpsc.gov

Dept. of Housing & Urban Development (HUD)
http://www.hud.gov/

Dept. of Agriculture (USDA)
http://www.usda.gov/

Dept. of Energy (DOE)
http://www.energy.gov/

National Park Service (NPS)
http://www.nps.gov/

The Federal Register (FR) – laws published
http://www.nara.gov/fedreg/

U.S. Government Printing Office – get documents and publications
http://www.access.gpo.gov/

## Additional References & Resources

There are many environmental, health, and safety consulting companies in Ohio, for example:

WorkSafe, Ltd. EHS Consultants (Authors of this Guide)
http://www.seorf.ohiou.edu/~ad913

Performance Management Consultants
(Safety Management, Behavior Safety, and Employee Development)
http://www.pmcconsulting.com/index.htm

Universities usually have an Environmental Health & Safety Departments. Their web sites have many EHS resources available on them. For example:

Ohio University
http://www-ehs.hudson.ohiou.edu

Ohio State University
http://www.ehs.ohio-state.edu

CWRU
http://www.cwru.edu/finadmin/does/oes.html

University of Toledo
http://www.safety.utoledo.edu/

Bowling Green State University
http://www.bgsu.edu/offices/envhs/index.htm

Wright State University
http://www.wright.edu/admin/ehs/

Major Environmental Laws in the U.S.
http://www.epa.gov/epahome/laws.htm

Ohio Laws, Rules, and Codes
http://www.state.oh.us/ohio/ohiolaws.htm

CDC Health Information by Topic
http://www.cdc.gov/health/diseases.htm

Free training is available, from the State and on-line:

Ohio BWC Occupational Safety & Health Training Center
(Free OSHA classes for your employees)
http://www.ohiobwc.com/employer/programs/safety/SandHEducation.asp

Power Point Safety Training Presentations
http://siri.uvm.edu/ftp/ppt/powerpt.html

SafeUSA Program
http://www.cdc.gov/safeusa/publications/SafeUSA%20Overview.pdf

There are many safety equipment and supply companies, such as:

Lab Safety Supply Co. (safety equipment)
http://www.labsafety.com/

MSA (safety equipment)
http://www.msanet.com/

Best Chemrest (protective glove selection)
http://www.chemrest.com/

Other Internet Sites – Occupational Safety & Health
http://www.osha-slc.gov/SLTC/generalshreferences/otherresources.html

National Sanitation Foundation
http://www.nsf.org/

Building Environmental Council of Ohio (BECO)
http://members.tripod.com/becohio/

Association for Professionals in Infection Control & Epidemiology (APIC)
http://www.apic.org

**Personal/Local References and Resources**

Add your own local or personal web resources here.