



## Indoor Environmental Quality Training Companion Guide

**BEFORE** you watch the training, answer the following questions:

1. What do you think are the components of an Indoor Environmental Quality program?
2. What do you currently have in place in your school or district?

**AFTER** you watch the training, answer the following questions:

1. What additional aspects of indoor environmental quality did you learn during the training?
2. What will you do to begin to improve indoor environmental quality at your school or district?
3. What further information do you need to get started and where can you find it?

**Green Schools:** A green school creates a healthy environment that is conducive to learning while saving energy, resources and money.

**Indoor Environmental Quality Plan:** The focus of an Indoor Environmental Quality Plan (IEQ) plan is to improve the learning environment and reduce the exposure of building occupants and maintenance personnel to potentially hazardous chemical, biological and particulate contaminants that adversely affect air quality.

Goals of an IEQ plan are to:

- Ensure a quiet, well-lit learning environment
- Ensure high-quality indoor air
- Reduce the use of toxic and harmful materials
- Control the source of pollutants

Components of an IEQ plan:

- Indoor Air Quality Management
- Environmental Tobacco Smoke Control
- Green Cleaning
- Integrated Pest Management
- Indoor Chemical and Pollutant Source Control
- Products and Equipment
- Occupant Comfort

## **Recommended Assessments**

Gathering the answers to the questions below can help you determine how far along your school or district is in implementing an indoor environmental quality plan. These are not exhaustive lists, but they provide a good starting point.

### **Indoor Air Quality**

- Is there adequate fresh air in classrooms?
- Is there a HVAC maintenance plan?
- Is there an Indoor Air Quality (IAQ) Management Plan?
- What is the frequency of filter changes?
- Does the IAQ Management Plan have a section on facility alterations and additions?
- Is smoking allowed anywhere at your school?
- Are there odors that indicate moisture (mold or mildew) or other problems?

### **Occupant Comfort**

- Do students have access to daylight and views in indoor spaces?
- Are there lighting controls in each classroom?
- Are the acoustics in classrooms acceptable?
- Are there echoes or dead zones?
- Is there conflicting noise?
- Conduct an Occupant Comfort Survey. Collect responses from school staff on topics such as thermal comfort, acoustics, indoor air quality, lighting levels, and building cleanliness. Make sure to document the results.

### **Green Cleaning**

- How clean is the school? Is dust visible?
- What is the green cleaning policy?
- Can you smell the cleaning products long after cleaning is complete?
- Are green cleaning techniques employed?
- Is there an entryway system pollutant capture system, such as walk-off mats, grates, grills? Is it cleaned regularly?

(See the **Green Cleaning** web training module and the related companion guide for more details on assessments and developing a green cleaning program.)

### **Groundskeeping**

- What kind of exterior pest management practices are used?
- Are parents, faculty or staff notified if pesticides or fertilizers will be used?
- What kind of lawn-care services are used? Is the equipment gasoline, battery or electric powered?
- How is landscape waste disposed?
- Are buses or parents' cars allowed to idle?
- Is stormwater managed onsite or does it go into a municipal sewer?
- What kind of snow-removal practices are employed? Chemical?
- What kinds of paints are used on the building exterior?

(See the **Groundskeeping** web training module and the related companion guide for more details on assessments and developing a green groundskeeping program.)

## **U.S. EPA's IAQ Tools for Schools Program**

The Indoor Air Quality (IAQ) Tools for Schools Program is a comprehensive resource to help schools maintain a healthy environment in school buildings by identifying, correcting, and preventing IAQ problems. The program includes an *Action Kit* that shows schools how to carry out a practical plan to improve indoor air problems at little- or no-cost using straightforward activities and in-house staff. The kit provides best practices, industry guidelines, sample policies, and a sample IAQ management plan. PDF versions are available for most items, and schools can also download and modify various checklists as MS Word documents. The IAQ Problem Solving Wheel and the IAQ Tools for Schools video collection can be ordered free of charge. To learn more, go to [www.epa.gov/iaq/schools/index.html](http://www.epa.gov/iaq/schools/index.html).

## LEED Certification: A Way to Define Green for New and Existing Schools

In 2000, the U.S. Green Building Council (USGBC) established the LEED® rating system as a way to define and measure “green buildings.” In school terms, LEED is like a report card for buildings, demonstrating to the community that a facility is built and/or operated in a way that supports the health and well-being of occupants and saves energy, resources and money. LEED is an internationally recognized certification system that measures how well a building performs using several metrics:

- sustainable land use
- energy savings
- water efficiency
- CO<sub>2</sub> emissions reduction
- improved indoor environmental quality
- stewardship of resources

LEED provides a concise framework for identifying and implementing practical and measurable green building solutions. Based on established sustainable building practices and emerging concepts, the LEED rating systems are performance-based and comprehensive in scope. Points are awarded on a 100-point scale, and credits are weighted to reflect their potential environmental impacts. Different levels of certification are granted based on the total number of earned points. The four progressive levels of certification are: Certified, Silver, Gold and Platinum.

Once the credits are implemented and the energy-efficiency and performance requirements met, the final step for certification is submitting the project certification documentation using the Web-based LEED Online system. The Green Building Certification Institute (GBCI) reviews the application and provides feedback. If all requirements are met, GBCI awards LEED certification to the building.

LEED Rating Systems:

LEED® for New Construction & Major Renovations™  
LEED® for Existing Buildings: Operations & Maintenance™  
LEED® for Commercial Interiors™  
LEED® for Core & Shell™  
LEED® for Schools™  
LEED® for Neighborhood Development™  
LEED® for Homes™  
LEED® for Retail™  
LEED® for Healthcare™

### Green Building Certification Institute (GBCI)

Established in 2008, GBCI is the institution that grants both project certification and professional credentials that recognize excellence in green building performance and practice. GBCI administers project certification for commercial and institutional buildings and tenant spaces under USGBC’s LEED rating systems. GBCI also manages the professional credentialing programs based upon the LEED rating systems, including the LEED Green Associate and LEED AP credentials.

### How Much Does LEED Cost?

The cost to certify a school facility is based on the project’s square footage. The process provides a comprehensive third-party review of the energy and environmental performance of the school and ensures that the stated goals of the project are met.

The cost to register and certify at 100,000-square-foot school for USGBC members is less than \$4,000 using LEED for Existing Buildings: Operations & Maintenance, and less than \$5,500 using LEED for Schools.

Prices are determined by GBCI and are subject to change. For complete pricing information, visit [www.gbci.org](http://www.gbci.org).

## Glossary

**Biodegradable Product:** Biodegradable cleaning products use organic material such as plant and animal matter and other substances originating from living organisms. These products break down through natural processes.

**Environmentally Preferable Product:**

Environmentally preferable products are certified by a third-party environmental label, such as Green Seal or EcoLogo. The label indicates that the product and its packaging were developed based on a consideration of human health and safety, ecological toxicity, environmental impacts, and resource conservation.

**Indoor Air Quality Building Education and Assessment Model (I-BEAM):** Released in 2002, I-BEAM is a guidance tool designed for use by building professionals and others interested in indoor air quality in commercial buildings. I-BEAM updates and expands EPA's Building Air Quality guidance and was designed to be a comprehensive state-of-the-art guidance for managing IAQ in commercial buildings. I-BEAM contains text, animation/visual, and interactive/calculation components that can be used to perform a number of diverse tasks.

I-BEAM consists of many individual modules which explain different aspects of IAQ including how to manage, operate, and maintain your building for IAQ, and how to insure that your energy efficiency projects are compatible with IAQ. I-BEAM creates a way for you to learn how to manage for indoor air quality as an integral part of your daily building management activities. You can use I-BEAM to train management and building personnel on IAQ issues and tasks. You can use I-BEAM as a reference tool for specific issues. You can use I-BEAM to assist in solving problems and responding to complaints. You can use I-BEAM to set up an IAQ management program including maintenance, housekeeping, and renovation, and energy efficiency functions to protect IAQ.

**Low-emitting Materials:** Low-emitting materials are products that do not release significant pollutants into the indoor environment. These products contain zero- and low-volatile organic compounds (VOCs).

**Volatile Organic Compounds (VOCs):** VOCs are carbon-based chemicals that easily evaporate at room temperature. Breathing low levels of VOCs for long periods of time may increase some people's risk of health problems. Common symptoms of exposure to VOCs include eye, nose and throat irritation; headaches; nausea; dizziness; and worsening of asthma symptoms.

## **LEED for Existing Buildings: Operations & Maintenance Rating System Credits Related to Indoor Environmental Quality**

The LEED for Existing Buildings: Operations & Maintenance rating system credits that apply to indoor environmental quality fall under the Indoor Environmental Quality (IEQ) credit category.

### **IEQ Prerequisite 1 - Outdoor Air Introduction and Exhaust Systems**

Establish minimum indoor air quality (IAQ) performance to enhance indoor air quality in buildings, thus contributing to the health and well-being of the occupants.

### **IEQ Prerequisite 2 - Environmental Tobacco Smoke Control**

Prevent or minimize exposure of building occupants, indoor surfaces and systems to environmental tobacco smoke (ETS).

### **IEQ Prerequisite 3 - Green Cleaning Policy**

Reduce the exposure of building occupants and maintenance personnel to potentially hazardous chemical, biological and particulate contaminants, which adversely affect air quality, human health, building finishes, building systems and the environment. Develop and maintain a green cleaning policy for the school building and site.

### **IEQ Credit 1.1 - IAQ Best Management Practices: IAQ Management Program**

Enhance indoor air quality (IAQ) by optimizing practices to prevent the development of indoor air quality problems in buildings, correcting indoor air quality problems when they occur and maintaining the well-being of the occupants.

### **IEQ Credit 1.2 - IAQ Best Management Practices: Air Delivery Monitoring**

Provide capacity for ventilation system monitoring to help sustain occupant comfort and well-being. Install permanent, continuous monitoring systems that provide feedback on ventilation system performance to ensure that ventilation systems maintain minimum outdoor airflow rates under all operating conditions

### **IEQ Credit 1.3 - IAQ Best Management Practices: Increased Ventilation**

Provide additional outdoor air ventilation to improve indoor air quality (IAQ) for improved occupant comfort, well-being and productivity.

### **IEQ Credit 1.4 - IAQ Best Management Practices: Reduce Particulates in Air Distribution**

Reduce exposure of building occupants and maintenance personnel to potentially hazardous particulate contaminants, which adversely affect air quality, human health, building systems and the environment.

### **IEQ Credit 1.5 - IAQ Best Management Practices: IAQ Management for Facility Alterations and Additions**

Prevent indoor air quality (IAQ) problems resulting from any construction or renovation projects to help sustain the comfort and well-being of construction workers and building occupants. Develop and implement an IAQ management plan for the construction and occupancy phases

**IEQ Credit 2.1 – Occupant Comfort: Occupant Survey**

Provide for the assessment of building occupants' comfort as it relates to thermal comfort, acoustics, indoor air quality (IAQ), lighting levels, building cleanliness and any other comfort issues.

**IEQ Credit 2.2 - Controllability of Systems: Lighting**

Provide a high level of lighting system control by individual occupants or groups in multi-occupant spaces (e.g., classrooms or conference areas) to promote the productivity, comfort and well-being of building occupants.

**IEQ Credit 2.3 - Occupant comfort: Thermal Comfort Monitoring**

Support the appropriate operations and maintenance of buildings and building systems so that they continue to meet target building performance goals over the long term and provide a comfortable thermal environment that supports the productivity and well-being of building occupants.

**IEQ Credit 2.4 - Daylight and Views**

Provide building occupants with a connection between indoor spaces and the outdoors through the introduction of daylight and views into the regularly occupied areas of the building.

Reduce the exposure of building occupants and maintenance personnel to potentially hazardous chemical, biological and particulate contaminants that adversely affect air quality, human health, building finishes, building systems and the environment.

**IEQ Credit 3.3 – Purchase of Sustainable Cleaning Products and Materials**

Implement sustainable purchasing for cleaning materials and products, disposable janitorial paper products and trash bags.

**IEQ Credit 3.4 - Sustainable Cleaning Equipment**

Implement a program for the use of janitorial equipment that reduces building contaminants and minimizes environmental impact.

**IEQ Credit 3.5 - Indoor Chemical and Pollutant Source Control (Entryway Systems)**

Employ permanent entryway systems (grilles, grates, mats) to capture dirt and particulates entering the building at all public entry points.

**IEQ Credit 3.6 - Indoor Integrated Pest Management (IPM)**

Develop, implement and maintain an indoor integrated pest management (IPM) plan.

## U.S. Green Building Council Publications and Resources

### **Green Existing Schools Implementation Workbook (PDF)**

The *Green Existing Schools Implementation Workbook* includes sample policies, programs, and plans; data collection forms and tables; and sample surveys.

### **Green Existing Schools Project Management Guide (PDF)**

The *Green Existing Schools Project Management Guide* includes general guidance on navigating the LEED for Existing Buildings: O&M certification process, including how to conduct personnel and organizational assessments, educate and train staff, initiate the certification process, and manage a school or district-wide sustainability program.

### **LEED 2009 for Existing Buildings: Operations & Maintenance Project Checklist (XLS)**

The LEED Project Checklist is a scorecard to track the credits being pursuing toward certification.

### **LEED 2009 for Existing Buildings: Operations & Maintenance Rating System (PDF)**

The LEED 2009 for Existing Buildings: Operations & Maintenance rating system summarizes the intent, requirements, and technologies/strategies for each credit.

[Sustainable Purchasing Tracker – Materials and Resources](#)

[Sustainable Purchasing Tracker – Indoor Environmental Quality](#)

[Solid Waste Management Tracker](#)

[Occupant Commuting Survey - Summary Table](#)

**The publications and resources can be found at the Centers for Green School's Green Existing Schools Toolkit at [www.centerforgreenschools.org/k12toolkit](http://www.centerforgreenschools.org/k12toolkit).**

### **Questions?**

The Center for Green Schools at USGBC has assembled a panel of experts, facilities staff, and school district sustainability officers, to answer your questions. Please email [schools@usgbc.org](mailto:schools@usgbc.org) with the subject line "Green Existing Schools," and we will promptly connect you with a peer who will help you find the answers.

## Indoor Environmental Quality References and Resources

The Center for Green Schools at USGBC  
<http://www.centerforgreenschools.org/>

Center for New American Dream (CNAD)  
<http://www.newdream.org/cleanschools/safelist.php>

Environmental Choice  
<http://www.environmentalchoice.org>

Environmental Choice Certified Products  
<http://www.ecologo.org>

Green Building Certification Institute (GBCI)  
<http://www.gbci.org>

Green Existing Schools Toolkit  
[www.centerforgreenschools.org/k12toolkit](http://www.centerforgreenschools.org/k12toolkit)

Green Seal  
<http://www.greenseal.org>

Healthy Schools Network, Inc.  
<http://www.healthyschools.org>

U.S. EPA Clean School Bus  
<http://www.epa.gov/cleanschoolbus/antiidling.htm>

U.S. EPA HealthySEAT  
<http://www.epa.gov/schools>

U.S. EPA IAQ Tools for Schools  
<http://www.epa.gov/iaq/schools/>

U.S. EPA I-BEAM  
<http://www.epa.gov/iaq/largebdgs/ibeam/index.html>

U.S. Green Building Council (USGBC)  
<http://www.usgbc.org>

### **GREENGUARD**

[www.greenguard.org](http://www.greenguard.org)

The GREENGUARD Environmental Institute certifies products and materials for low-chemical emissions and provides a resource for choosing healthier products and materials for indoor environments. All certified products must meet stringent chemical emissions standards based on established criteria from key public health agencies. GREENGUARD Certification is broadly recognized and accepted by sustainable building programs and building codes worldwide.