Center for Green Schools
at the U.S. Green Building Council

School District Energy Efficient Indoor Air Quality Management Plan Toolkit

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ACKNOWLEDGEMENTS

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The American Lung Association is a nationwide nonprofit committed to improving respiratory health through education and research. Learn more at lung.org.

Since its inception in 2002 the Go Green Initiative (GGI) has worked with K-12 school districts to protect children's health from environmental contaminants and to conserve natural resources for future generations. Learn more at gogreeninitiative.org.

The University of Utah is a top-tier R1 research institution, recognized for its leadership in scientific inquiry and educational excellence. Learn more about University of Utah's work on school air quality.

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Cover Photo: Bancroft Elementary School | LEED Gold | Washington, D.C. | Lauren K Davis for Feinknopf Photography

Introduction

BACKGROUND

Each day, over 50 million people in the U.S. spend a significant amount of their time attending or working in a school, yet many schools do not have programs to address indoor air quality (IAQ). Poor IAQ in schools has been linked to adverse health and respiratory effects, increased absenteeism, worsened academic performance, and higher rates of teacher burnout and turnover. However, fewer than half of surveyed school districts have implemented an IAQ program, and only six states require one including Connecticut, Minnesota, New Jersey, Oregon, Rhode Island, and Wisconsin.

At the same time, energy management remains a critical focus for schools. Energy costs are typically the second-largest operating expense after staff salaries, and simple behavioral and operational measures alone can reduce energy costs by up to 25 percent. A well-designed energy-efficient IAQ management plan can address both objectives—improving air quality and reducing energy usage. The COVID-19 pandemic and more frequent extreme weather events have further emphasized the need for schools to strengthen both air quality and energy resilience. By developing a comprehensive, energy-efficient IAQ management plan, districts can clarify for their community and their staff how health, sustainability, and budgetary goals align to support student success and long-term operational efficiency.

WHAT IS AN ENERGY EFFICIENT INDOOR AIR QUALITY MANAGEMENT PLAN?

A comprehensive, written energy efficient IAQ management plan outlines the policies and procedures a school district uses to maintain healthy IAQ and energy efficiency. These plans take a proactive approach to minimizing and responding to IAQ issues through effective operations and maintenance practices, staff training, communications, and compliance with local and federal regulations. A comprehensive IAQ management plan will include best practices for the control of sources of airborne pollutants, adequate ventilation (i.e., introduction and distribution of adequate outdoor air), enhanced filtration using the central HVAC system and/or in-room filtration devices as needed, and maintenance of acceptable temperature and humidity. Because many of these decisions and procedures are determined at the school district level, an energy efficient IAQ management plan is most effective when developed from the district level rather than by individual schools.

Some school districts establish their IAQ plans as approved school board policies, while others create them as internal guidance documents. Regardless of how the plan is approved, the IAQ plan must be a regularly updated written document accessible by all district staff, tailored to the school district's operations and resources, and aligned with its organizational mission.

Lakeview Elementary School | LEED Silver | Sugarland, TX | Photo: © Slyworks Photography

ABOUT THIS TOOLKIT

This toolkit is designed to offer helpful resources for school districts in the development and implementation of a comprehensive, written energy efficient IAQ management plan. While creating this toolkit, we compiled energy- and IAQ-related school board policies, plans, and communication materials from 26 school districts nationwide. The EPA IAQ Tools for Schools Model IAQ Management Plan, Energy Savings Plus Health guide, and the Minnesota Department of Health's IAQ Model plan served as the foundation for developing the provided IAQ plan language, in addition to comprehensive IAQ plans from school districts such as Orange County Public Schools, Wylie Independent School District, Boston Public Schools, and Madison Metropolitan School District. This toolkit complements these existing resources by incorporating updates and additions from school district plans and policies while providing resources and explanations for each section of the plan. Additionally, each section includes targeted questions for facilities and energy management teams to identify where IAQ strategies may intersect with energy efficiency practices, helping districts align their health and sustainability efforts.

Download the energy efficient IAQ management plan template that compiles all of the example language into an easy-to-edit document you can use to customize an plan for your district.

USING THIS TOOLKIT

This toolkit walks through each component of a comprehensive school energy efficient IAQ management plan and provides background information, resources, example language and considerations for applying an energy efficiency lens. Users can also download this plan template that compiles all the example language into an easy-to-edit document. When using the example plan language, placeholder text in brackets should be filled in, and edits should be made to reflect district procedures, policies, and regulations. Supplemental documents such as detailed standard operating procedures, checklists, and sample communications should be included where possible. Additionally, actual school district energy and IAQ policies can be found for reference on the U.S. Department of Education's Greenstrides resource database.

If you are looking for additional research on the topics contained within this toolkit, the School Health Research Library and Research Highlights compile studies and key findings from new research about school building impacts on occupant health and performance. In addition, the School IAQ Fact Sheet Series provides more details about equipment and technologies that can impact IAQ in schools.

Florida Ruffin Ridley School | LEED Gold | Brookline, Massachusetts | Photo credit: @ Ed Wonsek

Comprehensive Energy Efficient IAQ Management Plan Contents

PLAN OVERVIEW

In the overview of the IAQ plan, it is important to share why the district is prioritizing IAQ by stating how the plan aligns with the district's mission. If possible, reference specific language from the district's existing mission, vision, or strategic plan. This section should also include the overarching goals of the IAQ plan and an overview of intended benefits to health, learning, and building operations.

MODEL IAQ PLAN LANGUAGE

OVERVIEW

[School district's name] is committed to ensuring healthy, safe, and comfortable learning and working environments for all students and staff. To provide high quality learning environments in alignment with **[school district's name] [mission/vision/strategic goal]**, the following energy efficient indoor air quality (IAQ) management plan outlines procedures and guiding principles that prevent, address, and monitor aspects impacting air quality and energy performance in school buildings with the following goals:

- Minimize the levels of indoor air pollutants to reduce the likelihood of occupant health problems, including asthma, respiratory tract infections, and allergic reactions.
- Control temperature and humidity and maintain adequate ventilation rates by repairing and maintaining HVAC equipment.
- Respond to IAQ-related concerns and problems in a prompt and thorough manner, and effectively communicate the progress of investigations and their resolution to all interested parties, while optimizing any operational changes for their potential impact on energy use.
- Minimize IAQ problems through measures such as preventative maintenance and regular building inspections to avoid school closures, minimize liability risks, and foster a positive relationship among parents, teachers, and the school administration.
- Establish district facility procedures and operations and maintenance (O&M) strategies to reduce energy use while maintaining healthy IAQ. Detail actions related to HVAC systems, building setpoints and schedules, preventive maintenance, lighting, building envelope, plug-load, food services, and vehicle idling.
- Incorporate IAQ and energy efficiency best practices into the planning and design of new construction and major renovation projects. Align district design standards with IAQ and energy goals to ensure building systems, materials, and layouts support healthy IAQ and long-term energy performance.

Coordinating IAQ and Energy Management: Key Questions

How have goals for effective building maintenance and operations been aligned with the district's broader mission and strategic plan? Are there existing district policies or procedures that align with IAQ management?

- **Why?** District goals around fiscal responsibility can often align with energy, IAQ, and resource conservation initiatives, and goals for student wellness and success hinge on attendance and healthy learning spaces.

Does the district have goals for reducing energy usage over time? How were those targets identified and what strategies are being considered to reach those goals?

- **Why?** Consider how IAQ could be impacted through energy efficiency upgrades and identify projects that achieve both goals for healthy and efficient schools.

Resources

IAQ Backgrounder, U.S. EPA
Overview of why air quality in schools is essential and factors that affect school IAQ.

Making the Case for Proactive IAQ Management: Value Proposition Worksheet, U.S. EPA
Guide for creating an "elevator pitch" that aligns program goals with district priorities.

Case Studies for Effective IAQ Management in Schools, U.S. EPA
Successful school district case studies in implementing comprehensive IAQ programs.

IAQ COORDINATOR AND TEAM

IAQ Coordinator

Dedicating a point person, referred to herein as an IAQ coordinator, to manage a comprehensive district-level IAQ plan is critical to the long-term success of the program and improvement strategies. Depending on the school district's size, structure, and resources, the IAQ coordinator may be a full-time paid staff member or a staff person with a related role in environmental health, risk management, or building maintenance who will act as the IAQ program lead. The coordinator's primary role should be to ensure that the policies and procedures within the IAQ management plan are adhered to and communicated appropriately and to ensure that incoming IAQ issues and concerns are addressed effectively and on time. The IAQ Coordinator should be someone who can make decisions on behalf of the school district and influence district leadership.

MODEL IAQ PLAN LANGUAGE

IAQ COORDINATOR

[School district's name] has identified **[name of person/position]** as the IAQ Coordinator for the district. The coordinator administers the IAQ Management Plan and reports to **[identify administrator position, Board of Education, etc.]**. The school administration and school board is committed to providing the necessary support to meet the school district's IAQ Management Plan objectives. The IAQ Coordinator has been trained through **[list state, national, or other trusted training programs and certifications]**.

THE IAQ COORDINATOR'S RESPONSIBILITIES INCLUDE:

Acting as the key contact person within the district to respond to and address IAQ issues and concerns including acting as the authorized representative to respond to parents, community members, and state agencies.

Coordinating the development and management of the district's written IAQ Management Plan. This includes:

- Establishing and overseeing an IAQ Team
- Coordinating and documenting annual building walkthroughs and ventilation system inspections
- Coordinating the investigations of reported IAQ issues and concerns
- Collaborating with the district's energy manager and/or HVAC controls and maintenance staff to align IAQ strategies with energy efficiency goals
- Informing and educating staff and hired contractors about indoor air quality procedures and policies
- Updating the IAQ Management Plan annually or when regulations change or new related programs are established
- Reporting updates about the progress of the IAQ Plan and an overview of needs to support the district's IAQ goals at least annually to the school board
- Manage compliance with IAQ-related regulations, such as smoking, vaping, asbestos, lead, vehicle idling, mercury, and pesticide applications
- Review renovation projects to determine whether they appropriately address IAQ concerns and are consistent with the IAQ Management Plan and other requirements

IAQ Team

Establishing a district-level IAQ team can also be an effective strategy for implementing, communicating, and gaining buy-in around the plan. At a minimum, regular internal cross-departmental meetings about incoming IAQ and energy use concerns and implementing the IAQ plan are needed, as nearly all staff roles can impact IAQ. The IAQ Team may include representatives from district departments such as facilities, administration, health services, custodial staff, academics, and others as appropriate. Some school districts may involve additional representatives, including teachers, custodians, school nurses, contractors, community experts, union presidents and parents.

MODEL IAQ PLAN LANGUAGE

IAQ TEAM

[School district's name] has established an IAQ Team to represent **[list departments and represented participant types including staff, contractors, community experts, and even parents]**. The IAQ Team assists the IAQ Coordinator by reviewing IAQ-related information and recommending IAQ policies to maintain and improve the air quality within district facilities and school buildings.

Led by the IAQ Coordinator, the IAQ Team is involved in the following efforts:

- Supporting the IAQ Coordinator to ensure good IAQ in all facilities and areas.
- Contributing to the IAQ Management Plan creation and implementation. The members distribute the IAQ checklists and the IAQ Backgrounder to the appropriate staff members.
- Meeting regularly **[monthly, quarterly, biannually, or another timeframe]** to review and resolve building system issues that are causing IAQ problems and/or energy inefficiencies.
- Meeting **[annually or as needed, indicate frequency]** to review the IAQ Management Plan, which includes the completion of walkthrough inspections of school buildings, key building systems evaluations and the review of existing policies in the IAQ Management Plan.
- Meeting to evaluate and respond to IAQ concerns that have been reported to the district. The team takes steps or recommends measures to resolve the reported concern.
- Maintaining IAQ Team meeting minutes, reports, and other documents in the IAQ Management Plan.
- Reviewing proposed changes to building systems operation that could impact air quality and energy use.

Coordinating IAQ and Energy Management: Key Questions

Are there any existing committees or recurring staff meetings that address energy management, sustainability, or health?

- **Why?** Given the direct connections of IAQ to occupant health, building system operations and energy, finding opportunities to include the IAQ Coordinator in cross-departmental meetings can support proactive issue resolution and staff buy-in.

Who in the district is responsible for energy management tasks, such as utility bill tracking and building controls and scheduling?

- **Why?** The IAQ coordinator should work closely with the energy manager and building controls manager to align IAQ improvement strategies with energy goals,identifying opportunities to improve air quality while reducing costs.

Resources

Indoor Air Quality Team Charter, Boulder Valley School District, CO
Example outline of an IAQ team structure, membership, and meeting logistics.

Advisory Committees for Healthy and Sustainable Schools, Center for Green Schools
Four school district case studies on establishing cross-sector teams for overseeing health and sustainability goals.

EPA IAQ Master Class Professional series, U.S. EPA
Ten 1-hour technical, web-based trainings for school staff executing an IAQ management program.

Clean Air in Schools Course, Center for Green Schools
Free, self-guided course focused on the technical aspects of assessing and improving ventilation, filtration, air cleaning, and monitoring IAQ in school buildings.

Registered Environmental Health Specialist, NEHA
Covers a range of environmental health topics including vector control, water quality, hazardous materials, air quality, and the built environment.

CASE STUDY: BOULDER VALLEY SCHOOL DISTRICT

Boulder Valley School District established a district-level IAQ team in 2017 comprised of facilities staff, teachers and school leaders, school nurses, community health professionals, and parents to respond to air quality complaints, prioritize improvement actions, and communicate best practices to stakeholders. Having this committee that reported to the Board of Education before the onset of the COVID-19 pandemic proved an important asset that enabled the district to disseminate various guidance and gather feedback from community and local experts. Boulder Valley has since moved the IAQ team to an on-call advisory role and has established a new Sustainability Advisory Committee that oversees progress toward healthy and sustainable schools.

STAFF EDUCATION AND COMMUNICATION

Ensuring optimal IAQ in school buildings requires the active involvement of all district employees. Trained employees familiar with the IAQ management plan are more likely to adhere to best practices and promptly identify and report potential issues. Staff education on IAQ and energy should be tailored to their specific roles and responsibilities. Moreover, transparent communication with staff and the school community is crucial for fostering trust and garnering support for IAQ improvement initiatives. Proactive communication regarding the district's IAQ plan, contents, and objectives helps establish expectations and facilitates communication channels before school emergencies.

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MODEL IAQ PLAN LANGUAGE

STAFF EDUCATION

All district employees play an important role in managing both indoor air quality and energy consumption. **[School district's name]** provides an annual energy and IAQ training session, as part of the **[name of training program, such as health and safety, employee right to know]**. The **[IAQ Coordinator or another qualified person]** performs the training.

In addition to the general training, staff receive specific training related to their roles:

- Teachers and school leaders: Managing classroom animals, food, and plants; selecting furniture; minimizing clutter; using approved cleaners; understanding air movement and thermostat settings; reporting leaks; and reporting IAQ concerns.
- School nurses: Recognizing and documenting IAQ-related health symptoms, participating in IAQ investigations, collaborating on communication with families.
- Bus drivers: Anti-idling practices and use of approved cleaning products.
- Custodians: Cleaning procedures; managing moisture and chemical use; identifying and reporting IAQ problems.
- Grounds: Safe pesticide and chemical use; implementing practices to minimize IAQ impacts (e.g., keeping grass clippings away from air intakes).
- Facilities and environmental health staff: Managing ventilation, operations, maintenance, and moisture control.
- Procurement staff: Purchasing low VOC / low emissions products and materials.

COMMUNICATION

In order to develop and maintain the trust of the community and staff, the IAQ Coordinator and other designated district employees communicate with relevant parties in a prompt, honest and courteous manner until the issue is resolved. When an IAQ concern is addressed or resolved, the IAQ Coordinator will report the measures taken and the resolution of the identified concern to the appropriate parties. The IAQ Coordinator is prepared to answer staff and parents' basic questions, and the IAQ Team and Coordinator will inform staff and parents annually about how to access the district's IAQ Plan, how to report IAQ concerns, how to contact the IAQ Coordinator, and scheduled pesticide applications.

Coordinating IAQ and Energy Management: Key Questions

Do school staff receive training or regular communications regarding energy efficiency best practices or policies?

- **Why?** Regular communications regarding IAQ are a natural opportunity to promote energy-saving behaviors and vice versa, helping staff understand their role in maintaining healthy and efficient schools.

Are students engaging in energy conservation activities or curriculum that uses the building as a learning tool?

- **Why?** Adding an IAQ lens to energy-focused curricula and campaigns deepens awareness of how building systems impact health, learning, and energy use.

When does the district communicate about building upgrades or initiatives, are the cost savings highlighted tied to both energy and indoor air quality improvements?

- **Why?** Proactively communicating the financial benefits of IAQ and energy efficiency projects can build community and staff buy-in and show how these investments contribute to healthier schools and more efficient operations.

Resources

IAQ Tools for Schools Communications Guide, U.S. EPA

Green Classroom Professional Certificate, Center for Green Schools
The GCP certificate program provides pre-K-12 school staff with the knowledge to identify what supports or impedes healthy and environmentally sustainable learning spaces.

Powering Down: A Toolkit for Behavior-Based Energy Conservation in K-12 Schools
Guidance and case studies for engaging students and staff in school energy conservation.

ENERGY STAR Energy Efficiency and Indoor Air Quality Student Toolkit, EPA
Student activities for energy benchmarking and building walkthroughs.

PRINCE GEORGE'S COUNTY PUBLIC SCHOOLS

Teachers in Prince George's County Public Schools are engaging students in hands-on investigations using real-time IAQ sensors. To support this work, the district launched an educator-led **professional learning community (PLC)** to coordinate efforts across departments, develop training materials, and facilitate monthly sessions. Educators meet to share strategies, co-create curriculum, and use their own school buildings as learning labs. This initiative stems from the district's **Climate Action Plan**, which identified climate education and teacher leadership as key strategies for advancing environmental justice.

IAQ COMPLAINTS

Teachers, administrators, and custodians are the eyes and the ears of the school and play a critical role in identifying and monitoring IAQ issues. Training staff to identify potential IAQ risks helps to ensure that staff are proactively looking for and working to prevent IAQ issues. Providing clear and easy-to-use procedures for reporting concerns helps to promptly resolve issues.

MODEL IAQ PLAN LANGUAGE

All **[School district name]** staff are responsible for promptly reporting suspected IAQ problems and are trained on how to identify and report IAQ issues through **[an annual training, video, back-to-school memo, etc.]**. To report an IAQ issue, a report of the issue must be filed through **[their supervisor, the IAQ Complaint form, an email address/ phone number, etc.]**. Within the report, details about the **[date, location, reporter, and space conditions where the reported issue is being observed]** are collected. IAQ complaints are reviewed by **[staff role/ IAQ Coordinator]** within **[# hours/days]**. The **[staff role/ IAQ Coordinator]** will conduct an investigation of the reported issue and provide a report including findings and recommended actions or implemented solution to the **[building administrator, reporter, district facilities manager, etc.]** typically within **[# days]**.

IAQ complaints and investigation reports are kept on file for **[# years]**. The **[IAQ Coordinator]** reviews complaints and reports **[quarterly/annually]** for potential trends to identify and predict future IAQ issues in buildings.

Coordinating IAQ and Energy Management: Key Questions

Whose role is it to identify issues of excessive energy use and how are investigations conducted?

- **Why?** Investigations into IAQ concerns are an optimal time to also address potential issues causing excess energy use and vice versa.

Is there a process to cross-reference IAQ complaints with energy data or building automation system alerts?

- **Why?** Trends in IAQ complaints (e.g., recurring musty smells or inconsistent temperatures) may align with data patterns from building controls systems that help diagnose system inefficiencies. As applicable, complaint investigations should include a review of building system run-times, zone control settings, and sensor accuracy.

Resources

IAQ Complaint Reporting Form, Montgomery County Public Schools
Example district reporting form and instructions.

IAQ Building Education and Assessment Model Forms, EPA
Includes example occupant complaint forms and building assessment checklists.

BUILDING ASSESSMENTS

Regular building assessments play a crucial role in proactively identifying IAQ problems that can significantly impact energy usage and the health of students and staff. Establishing achievable building walkthrough procedures ensures that inspections are thorough and systematic, covering key areas prone to IAQ concerns, such as ventilation systems, chemical storage areas, and areas with potential moisture accumulation. Strategies for effective building walkthroughs may include creating digital checklists or integrating them into the work order system, training staff members to recognize signs of IAQ issues during walkthroughs, and scheduling regular inspections at predetermined intervals. Schools can proactively identify and address IAQ and energy usage concerns by prioritizing regular building inspections, ultimately fostering a healthier learning environment for students and staff.

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MODEL IAQ PLAN LANGUAGE

BUILDING ASSESSMENTS

The indoor environmental quality and condition of school district buildings are evaluated by conducting a detailed inspection at least once every year. The inspections check the occupied spaces (classrooms, hallways, offices, kitchens) and other areas that may affect IAQ and energy usage (exterior, roof, mechanical rooms, bathrooms, storage rooms, and boiler rooms) to identify problems related to ventilation systems, building envelope, cleaning and chemicals, pests, moisture, odors, and reported occupant concerns.

The annual inspections are conducted using a checklist that can be found within the IAQ Plan **[in Appendix _]**. Each building inspection is conducted by **[the IAQ coordinator (preferred)/ building engineer/ maintenance manager/ external consultant]**. Following the completion of each inspection:

- Identified issues are reported promptly through the work order management system to be resolved.
- Identified issues or risks requiring more significant equipment replacement, consulting, or renovation are tracked for medium to long range planning.
- The IAQ Coordinator and energy manager work together to ensure that identified issues are resolved in a timely manner.
- The IAQ Coordinator provides a report to each building's leadership with the inspection findings and status of resolution within 30 days of the inspection.
- Records of inspections and reports are kept in **[state location]**
- **[Include if relevant: testing parameters such as carbon dioxide, carbon monoxide, temperature, humidity, moisture meter measurements, etc. to detect potential IAQ issues, and the guidelines used to interpret the measurements.]**

Coordinating IAQ and Energy Management: Key Questions

Does the district have a process for analyzing energy bills and benchmarking energy usage?

- **Why?** Energy benchmarking is critical to understanding how buildings across your district are performing. Excessively high or suspiciously low energy usage might point to potential IAQ concerns related to overridden or under-performing equipment. Free tools like ENERGY STAR® Portfolio Manager® or an Excel spreadsheet can be used to track data and analyze trends.

Has the district done retro-commissioning of existing HVAC systems and controls?

- **Why?** Retro-commissioning (RCx) schools every 5-10 years is a cost-effective building tune-up strategy involving the assessment and improvement of HVAC systems in existing buildings through quick payback improvements to reduce energy use and improve IAQ.

Have building energy audits been conducted in the past or on a regular basis?

- **Why?** Energy audits are an additional tool for identifying building retrofit opportunities that can improve IAQ and energy efficiency. They can range from simple walkthroughs conducted in-house to deep-dive analyses provided by outside contractors.Work with your utility to see if there are any technical or financial assistance programs.

Resources

Walkthrough Inspection Checklist, U.S. EPA
Checklist for conducting school walkthroughs for safety and environmental quality.

IAQ Preventative Maintenance Sample Equipment Inventory, U.S. EPA
Sample inventory sheet to gather equipment information that may be included in inspections.

Summer IAQ Walkthrough Checklist, Orange County Public Schools
Simple checklist with visuals that can be used by any school staff to document building conditions

ENERGY STAR Portfolio Manager recorded trainings and How-To Guides, EPA

Building Services Indoor Air Quality Checklist, Montgomery County Public Schools
Example building assessment checklist completed after receiving an IAQ complaint.

Commissioning and Retro-Commissioning Templates and Training, LBNL
Includes links to a sample scope of work, RFP template, and free online training for building retuning.

Safe School Inspection Guidebook, Los Angeles Unified School District
Guide for district conducted school safety inspections including walk throughs and reporting findings.

CASE STUDY: ORANGE COUNTY PUBLIC SCHOOLS

Since 2014, Orange County Public Schools in Florida has significantly decreased the occurrence of mold growth events during the summer months by engaging school principals in weekly building inspections through a **Google form**. While schools are largely unoccupied over the summer, school administrators play an essential role in reporting moisture concerns like high humidity, odors, leaks, and signs of mold growth. As a result, the district has increased the percentage of minor custodial and maintenance repairs by 27%. The increase indicates that the district is identifying and making repairs before they become an indoor air quality concern.

Universidad Iberoamericana Ciudad de México | Mexico City, Mexico | Photo: David Dominguez

VENTILATION AND FILTRATION SYSTEMS

Ventilation and filtration systems are pivotal in creating optimal learning and working environments, as they impact thermal comfort, moisture levels, and indoor pollutant levels. Research has demonstrated that classroom under-ventilation in the U.S. is far too common and is associated with increased infection transmission, higher absenteeism rates, and exacerbated asthma symptoms. Additionally, effective filtration systems capture particulate matter and allergens, mitigating the risk of respiratory issues and allergies. To ensure proper operation of ventilation systems, school districts can take several steps, including conducting regular preventative maintenance, evaluating ventilation performance, upgrading and changing filters. Providing supplemental HEPA air cleaners is also recommended to achieve target clean airflow rates where ventilation systems are deficient, during wildfires and airborne illness outbreaks, and in science, art, and technical spaces where additional pollutants are generated.

MODEL IAQ PLAN LANGUAGE

VENTILATION AND FILTRATION SYSTEMS

HVAC System Preventative Maintenance

- Regular preventative maintenance of heating, ventilation, and air conditioning (HVAC) systems is conducted in accordance with manufacturer recommendations and industry standard practice, including ASHRAE *Standard 180 Standard Practice for the Inspection and Maintenance of Commercial HVAC Systems*.
- Preventative maintenance activities are conducted using a checklist that can be found in **[Appendix in this document/link/physical location]** and submitted through the work order management system. Identified issues that could not be addressed during the maintenance visit are reported for repair.
- A schedule of seasonal and building-level maintenance tasks can be found in **[Appendix in this document/link/ physical location]**. Maintenance staff are notified of required, scheduled preventative maintenance tasks **[time frame: daily, weekly, bi-weekly]** through **[team meetings/work order system alerts/ email]**
- Licensed contractors are hired to perform preventative maintenance activities including **[ex. annual chiller maintenance and filter replacements]** and all other preventative maintenance tasks are completed by **[school district's name]** staff. Contractors will maintain compliance with district policies and state and federal regulations.
- Ventilation systems will use filters rated as MERV 13 or higher wherever compatible with the existing equipment, as determined by a professional mechanical engineer. Where MERV 13 filters cannot be used, filters with the highest MERV rating the system can accommodate will be used and HEPA portable air cleaners are provided.
- Filters are replaced according to manufacturer recommendations or at least once per year and inspected at least twice per year. Filters are inspected and replaced after wildfires and extreme weather events.

Resources

Comprehensive Maintenance Plan, Montgomery County Public Schools, MD

Example annual report of district maintenance goals, planned actions, and summary of resources.

IAQ Tools for Schools: Preventative Maintenance, U.S. EPA

Planning, assessment, and making the case tools for school preventative maintenance procedures.

Reopening Schools Guidance, ASHRAE

Equipment-specific checks and verifications to complete throughout the school year.

School IAQ Fact Sheet: HVAC Filtration, Center for Green Schools

Fact sheet on how filters work and their effectiveness in preventing viral transmission.

MODEL IAQ PLAN LANGUAGE

VENTILATION AND FILTRATION SYSTEMS

Building setpoints and scheduling

- Building temperature setpoints have been established to balance health, indoor moisture, and energy usage. Summer thermostat settings during occupied periods are **[add setpoints]**. Winter thermostat settings during occupied periods are **[add setpoints]**. Exceptions to these setpoints must be approved by **[staff role]**.
- During unoccupied periods, space temperatures will be maintained between **[add setpoints]** while keeping humidity below 60%.
- Spaces will be ventilated in accordance with ASHRAE Standard 62.1, using the ventilation rate procedure most appropriate for the building and space. Minimum cfm/person rates for classrooms and for science, art, and technical spaces have been established based on the standard. Spaces will have exhaust ventilation where there are sources of contaminants and as listed in ASHRAE Standard 62.1.
- Evening and weekend space use requests must be submitted at least **[# of days]** days in advance through **[link to submission form/contact person]** and should be concentrated in the fewest areas possible.
- Areas around thermostats must be clear of computers, televisions, and other electric appliances that give off heat.
- Supply and return air vents must be clear of obstructions such as clutter, books, signs, etc., that may interfere with airflow.
- Building pressure is monitored and controlled to avoid excessive negative or positive pressure.

Resources

Standard 55, Thermal Environmental Conditions for Human Occupancy, ASHRAE

Standard 62.1, Ventilation and Acceptable Indoor Air Quality, ASHRAE

Teacher's Classroom Checklist, EPA

MODEL IAQ PLAN LANGUAGE

VENTILATION AND FILTRATION SYSTEMS

Portable Air Cleaners

- **[School district's name]** has allocated portable air cleaners for **[select: all rooms, all classrooms, nurses/ health offices, band and choir rooms, gym, and workout rooms]**.
- Portable air cleaners selected must use high efficiency HEPA filters.
- Portable air cleaners will only use physical filtration and will not utilize any additive technologies including ionization, plasma, ozone generation, or UV lights. If selecting an electronic air cleaner, it must be UL 2998 certified for Zero Ozone Emissions.
- Device noise levels will not exceed **[ex. 35-45 dBA recommended]** dBA when running at full power.
- Devices that are ENERGY STAR certified are preferred.
- Filters are replaced following manufacturer recommendations and inspected for more frequent replacement after air pollution events, like wildfires.
- Teachers and staff are provided with instructions on how to operate the portable air cleaner in their spaces, including recommended settings, placement within the space, and suggested time of use.
- Schools can contact the IAQ Coordinator to request portable air cleaners. The IAQ Coordinator will review the applicable room sizes to select a device with an acceptable clean air delivery rate (CADR).

Coordinating IAQ and Energy Management: Key Questions

How are HVAC preventive maintenance tasks scheduled and tracked across the district?

- **Why?** An effective preventive maintenance program of mechanical equipment and controls not only proactively identifies issues that may impact air quality, but also helps to extend equipment life and identify issues that impact energy consumption and costs.

Are certain buildings prioritized for hosting after-hours/community events? And, if so, what are the considerations?

- **Why?** Whenever possible, schedule events to be hosted in the most energy efficient district buildings and/or in schools with zoned HVAC systems to limit equipment usage.

How does the district establish, record, and enforce building system setpoints?

- **Why?** While documenting setpoints that impact IAQ, consider recording all building system setpoints and optimizing for energy efficiency including hot and chilled water supply and return, building/duct static pressure, economizer, and demand controlled ventilation.

What ventilation targets has the district identified per school space type? Are ventilation rate targets based on room size or occupancy?

- **Why?** Setting ventilation targets based on occupancy (i.e. ASHRAE Standard 62.1) vs. room size (i.e. air changes per hour, ACH) can result in substantial energy savings in particularly small and large school spaces.

Have there been any challenges with maintaining setpoints and adequate airflow in large gathering spaces like gyms? What strategies has the district considered or implemented to address those challenges?

- **Why?** Installing ceiling fans in large gathering spaces and even classrooms to support the comfort range during the cooling season and increased air mixing.

Resources

School IAQ Fact Sheet: In-room Air Cleaners, Center for Green Schools
Guidance on selecting and operating in-room air cleaners in classrooms.

School IAQ Fact Sheet: Electronic Air Cleaners, Center for Green Schools
Overview of types of electronic air cleaner technology and how they work.

Standard 241, ASHRAE
Includes testing requirements for manufacturers to certify air cleaning systems.

Air purifier guidance, Boston Public Schools, MA
Example of guidance districts can provide to school staff when installing portable air cleaners.

CONTINUOUS INDOOR AIR QUALITY MONITORING

Technology advancements have made air quality sensors more widely available and less expensive. Implementing continuous indoor air quality monitoring enables schools to make data-driven decisions for targeted interventions and effectively prevent long-term IAQ issues. Setting targets or action thresholds for measured IAQ parameters can be an effective strategy for promptly and efficiently taking corrective actions and providing transparency when communicating about goals and expectations related to IAQ programs.

Currently, there are no comprehensive federal regulations for indoor air quality, with the exception of indoor exposure limits for radon. The following standards and guidelines can provide a starting point for school districts considering target ranges for IAQ parameters. However, targets can be customized based on criteria, including but not limited to, the local climate,

state/local guidance, baseline outdoor air quality measured, district goals and resources, and building and equipment conditions. It is important to note that some referenced standards, such as those for particulate matter, are health-based exposure recommendations, while other parameters, like CO_2, may serve as indicators of insufficient ventilation. Additionally, occupational limits like those listed from OSHA are set as health-based limits for healthy adult workers and are not directly applicable to children in schools. Example thresholds from school districts with continuous monitoring, such as Boston Public Schools and Montgomery County Public Schools, and others that include IAQ targets in school board policies, like Seattle and Portland Public Schools, have been included for reference.

EXAMPLE IAQ THRESHOLDS

TEMPERATURE

- **ASHRAE 55-2020**: 68°F – 74°F winter; 72°F – 80°F summer
- **Boston Public Schools**: > 78°F as "high"
- **Seattle Public Schools**: 68°F heating; 76°F cooling
- **Portland Public Schools**: 68°F heating; 74°F cooling
- Montgomery County Public Schools: 68°F – 76°F

RELATIVE HUMIDITY

- **ASHRAE 62.1-2016**: < 65% RH for mechanical systems with dehumidification capability
- **ASHRAE 62.1-2019**: max dew point of 60°F in mechanically cooled buildings
- **Boston Public Schools**: > 60% as "high", 15-min average
- Montgomery County Public Schools: 30% – 70%

CARBON DIOXIDE (CO_2)

- **Boston Public Schools**: > 2,000 ppm as "high", 15-min average
- Montgomery County Public Schools: < 1,200 ppm as "ideal for cognitive performance and proper ventilation"
- **OSHA**: 5,000 ppm, 8-hour average; health-based exposure limit
- **ASHRAE 62.1-2022 Addendum ab**: 600 ppm (classrooms) and 1200 ppm (multiuse assembly) above ambient only for implementing CO2 demand control ventilation (DCV).
- **ASHRAE 2022 position document on CO_2**: "ASHRAE Standard 62.1 has not contained a limit value for indoor CO_2 since the 1989 edition."

CARBON MONOXIDE (CO)

- **WHO**: 4 µg/m³, 24-hour average; health-based exposure limit
- ***EPA NAAQS**: 9 ppm 8-hr average; health-based exposure limit
- **Boston Public Schools**: > 4 ppm, instantaneous response actions and notification
- **NIOSH**: 35 ppm, 8-hour average; health-based exposure limit
- **OSHA**: 50 ppm, 8-hour average; health-based exposure limit

$PM_{2.5}$

- **WHO**: 15 µg/m³, 24-hr average health-based exposure limit
- ***EPA NAAQS**: 35 µg/m³, 24-hr average; health-based exposure limit
- **Boston Public Schools**: > 35 µg/m³ as "high", 15-min average

OTHER POLLUTANTS TO MEASURE, AS APPLICABLE TO YOUR BUILDING/SITE:

PM_{10}

- **WHO**: 45 µg/m³, 24-hr average health-based exposure limit
- ***EPA NAAQS**: 150 µg/m³, 24-hr average health-based exposure limit
- **Boston Public Schools**: > 150 µg/m³ as "high", 15-min average

FORMALDEHYDE AND OZONE

- Reference concentration limits in ASHRAE 62.1 Table 6-5 or LEED v5 Air Quality Testing and Monitoring credit

** denotes outdoor air quality standard*

MODEL IAQ PLAN LANGUAGE

INDOOR AIR QUALITY MONITORING

[School district's name] has installed **[#]** indoor air quality sensors across **[# of schools; space types]**. Installing sensors across the district enables **[school district's name]** staff to monitor and analyze real-time indoor air quality parameters to take proactive action in implementing IAQ improvements, communicate about school air quality to the community, and propose investments in HVAC systems in district buildings.

Each sensor is recording the following IAQ measures:

- Temperature
- Relative Humidity
- Carbon Dioxide (CO2)
- **[Others as applicable (carbon monoxide, particulate matter)]**

Outdoor air quality parameters are utilized as a baseline for comparison in establishing acceptable IAQ parameter levels. Outdoor air quality is measured at **[# sites/location names with outdoor air sensors]**. **[(If applicable) IAQ monitoring data and/or summary reports are publicly available on the district website]**

[School district's name] [department name(s), position title(s)] staff actively monitor IAQ parameter levels daily and are alerted to elevated levels. An exceedance is a measured indoor air quality level that is above stated elevated levels, but does not directly indicate impacts to occupant health and safety.

[Measured Indoor Air Quality Parameter or Pollutant, i.e. temperature, humidity, carbon dioxide, particulate matter]

- **[Typical/Recommended:**
- **Low:**
- **High:**
- **Exceedance Response:**
- **Referenced Guidelines and Recommendations:]**

SENSOR CALIBRATION AND MAINTENANCE

When purchasing indoor and outdoor air quality monitors, the district selects devices that can be regularly calibrated. All indoor and outdoor air quality monitors will be calibrated **[annually, according to manufacturer recommendations, per ASHRAE 62.1-2022 section 7.3]** and as needed. For CO, CO_2, airborne particulates, temperature, and relative humidity, annual calibration will be completed utilizing reference devices.

In the event an indoor and/or outdoor air quality monitor loses connection to the cloud-based management system or provides readings outside of the acceptable performance range for a given parameter, a service notification shall be generated for repair. **[A school district staff member, contractor name, or other]** will respond within **[#]** school days to initiate repair and recalibration of the affected monitor(s).

Resources

Low-Cost Air Pollution Monitors, U.S. EPA
Guidance on performance and selection of low-cost air quality sensors.

Air Sensor Toolbox, U.S. EPA
Latest science on the performance, operation and use of air sensor monitoring systems.

Standard 62.1-2022 section 7.3, ASHRAE
Specifications for accuracy, resolution, and frequency of calibration for CO, CO_2, PM2.5, and ozone sensors.

Coordinating IAQ and Energy Management: Key Questions

What indoor air quality data does the district currently collect through our building controls system or other IAQ monitoring sensors?

- **Why?** Integrating IAQ monitoring into building controls systems can reduce manual response times by automating ventilation system strategies to dilute air pollutants or minimize moisture damage. Many districts utilize demand-controlled ventilation (DCV) controls that monitor CO_2 levels to reduce ventilation rates in unoccupied spaces. If implementing DCV controls, ensure that DCV setpoints are set in accordance with ASHRAE 62.1 Addendum ab, including maximum setpoints of 600 ppm CO_2 above ambient levels for classrooms (typically around 1000 ppm) and 1200 ppm above ambient levels for multiuse assembly areas (typically around 1600 ppm).

Does the district have alerts or fault detection tools within our building controls system to identify when IAQ trends deviate from targets?

- **Why?** Tailored alerts for abnormal conditions (like persistently high CO_2 or humidity levels) can help identify failing or overridden equipment early, preventing both IAQ issues and energy waste.

Are there energy submeters installed in any buildings?

- **Why?** Real-time energy submetering, either at the equipment or building level, can help to identify inefficient equipment and operations, proactively identify failing systems, and provide deeper insights into decision-making for implementing IAQ improvements.

CASE STUDY: BOSTON PUBLIC SCHOOLS

Boston Public Schools (BPS) has been nationally recognized for its efforts to install nearly 4,500 IAQ sensors across all district classrooms measuring temperature, humidity, $PM_{2.5}$, PM_{10}, carbon dioxide, and carbon monoxide that are displayed in real-time on an online dashboard. Additionally, BPS developed and published a **comprehensive IAQ Management Plan**, **IAQ Monitoring and Response Action Plan** and **fact sheets** in partnership with Boston University.

ASBESTOS HAZARD EMERGENCY RESPONSE ACT (AHERA) MANAGEMENT

Asbestos, once commonly used in building materials, has been linked to severe respiratory diseases, including lung cancer and mesothelioma. Recognizing these risks, federal regulations such as the Asbestos Hazard Emergency Response Act (AHERA) mandate that schools inspect their facilities for asbestos-containing materials and develop comprehensive management plans to ensure their safe containment or removal. Compliance with these regulations involves regular inspections, proper labeling of asbestos-containing materials, employee training, and prompt response to any damage or deterioration that could release asbestos fibers into the air. By adhering to stringent asbestos regulations and implementing effective management practices, K-12 schools can protect the health and safety of students, teachers, and staff while maintaining a conducive learning environment.

MODEL IAQ PLAN LANGUAGE

ASBESTOS MANAGEMENT

Asbestos is a mineral fiber that can be found in some building materials. If these materials are damaged or disturbed, they may release asbestos fibers into the air. In compliance with federal law, **[School district's name]** has developed and maintains an Asbestos Hazard Emergency Response Act (AHERA) Management Plan that describes the location and condition of asbestos-containing building materials and documents the removal and repairs. The AHERA Management Plan can be found at **[location]**.

Asbestos Containing Materials, if present, are inspected by **[a licensed asbestos inspector]** every six months. Damaged asbestos containing material is assessed, documented, and/or removed by a licensed asbestos contractor and monitored by a licensed asbestos consultant. All buildings are reinspected for asbestos-containing material every three years.

[School district's name] posts an annual asbestos notification **[on the district website, Welcome Back booklet]** for families and staff to review. All contractors must review and sign the AHERA Management Plan before conducting any work in district buildings.

Coordinating IAQ and Energy Management: Key Questions

How are projects, including minor upgrades, reviewed for their potential to disturb hazardous materials?

- **Why?** Asbestos-containing material, lead paint, or PCBs may be disturbed during energy efficiency upgrades like lighting, HVAC equipment, and building envelope upgrades.

How are air leakage or building tightness tests, such as blower door testing, scheduled in relation to hazardous material abatement activities?

- **Why?** While recommended for confirming building tightness and improved energy performance, blower door testing should not be conducted after any asbestos abatement work to prevent friable asbestos materials from being disturbed.

Resources

Asbestos and School Buildings, U.S. EPA
Requirements and resources for school asbestos management plans.

AHERA Designated Person's Self Study Guide, U.S. EPA
Guidance for designated persons in schools to comply with federal asbestos regulations.

MERCURY

While mercury use in products has dramatically declined, there are still sources of mercury that can be found in schools, including, but not limited to, older glass thermometers, thermostats, science equipment, batteries, and fluorescent (CFL) lighting. Mercury-containing polymer floors, typically found in gymnasiums from the 1990s or earlier, can also be a source of mercury vapor. Exposure to mercury can take place through skin contact or the inhalation of vapors and can cause serious health problems, including permanent brain and kidney damage. Because of the severe health impacts and difficulty with clean-up, CDC recommendeds that schools establish a policy to identify, remove, and properly dispose of sources of mercury to prevent spills and exposure.

MODEL IAQ PLAN LANGUAGE

MERCURY

Elemental mercury and mercury-containing equipment are not permitted on school grounds. **[School district's name]** does not permit the purchasing of elemental mercury or mercury containing teaching aids such as thermometers and barometers. Mercury-containing light bulbs and thermostats shall be removed and replaced with non-mercury containing equipment wherever possible and new lighting and thermostats will be free of mercury. In the event of a spill, school staff will follow **[state pollution control, or other agency]** guidance and students will be removed from the affected area. Mercury-containing flooring, which contains phenyl-mercuric-acid (PMA), will be tested for mercury levels and removed if possible. Where mercury-containing flooring is not removed, mercury vapor levels in affected areas will be monitored to remain below 60 ng/m3. Cleaning practices that do not raise dust (i.e., no vacuuming or buffing) will be utilized, and the temperature of affected spaces will be kept as low as feasible, preferably about 68F. **[OR Testing and maintenance of mercury-containing flooring will be conducted in alignment with best practices outlined by the New Jersey Education Association.]**

Coordinating IAQ and Energy Management: Key Questions

What protocols are in place to identify and safely remove mercury-containing equipment during lighting or HVAC upgrades?

- **Why?** Mercury can be present in fluorescent lamps, thermostats, switches, and older ballasts. These components must be handled carefully to avoid breakage and exposure, and disposed of following hazardous waste regulations.

Which buildings still have original HVAC systems, thermostats, or electrical switches that haven't been upgraded in the last 20+ years?

- **Why?** Mercury-containing thermostats and switches were commonly used before 2007, so older systems are the most likely locations for these components.

Which buildings have non-LED lighting?

- **Why?** Lighting systems not replaced with LED lamps are likely sources of mercury in schools. The sale of mercury vapor lamps and ballasts was not banned until 2008. All fluorescent and most HID lamps contain mercury, while LED and incandescent lamps do not.

Resources

What to Do When Mercury Spills at School, Agency for Toxic Substances and Disease Registry
Instructions in case of mercury spills to limit student and staff exposure.

Mercury-Containing Flooring Guidance, New Jersey Education Association
Describes actions that need to be taken to identify suspect floors and reduce or eliminate any mercury exposure in schools.

Mercury in Schools, NYS Department of Health
Guidance for various school staff, inventory templates, and disposal guidance.

Don't Mess with Mercury Videos, Agency for Toxic Substances and Disease Registry
Short videos for school staff, students, and community members about the sources and dangers of mercury.

RADON

Radon is a colorless, odorless, naturally occurring gas that can seep into buildings through the surrounding soil. Radon is a serious environmental health concern and is the second leading cause of lung cancer in the U.S. A nationwide survey of radon in schools by the U.S. EPA estimates that nearly one in five schools have short-term radon levels above the recommended level of 4 pCi/L. The risk of radon exposure depends, in part, on the composition of the land that a building sits upon; to understand the level of risk for a particular area, consult the radon maps from the EPA or through your state's radon office. School systems can take action to protect students and staff from radon exposure by routinely testing all school buildings. However, even buildings in low radon potential risk areas should consider testing, as these maps do not capture every geological formation that lead to high levels of radon and therefore may not accurately represent the risk in a local area. Schools' radon testing and mitigation regulations vary by state, and your state radon office can advise on state-specific recommendations.

MODEL IAQ PLAN LANGUAGE

RADON

Radon is a naturally occurring gas that can enter any building from the underlying soil. Radon testing is **[voluntary/required by law]** and **[school district's name]** tests for radon regularly. The district's testing schedule dictates (1) at least every five years if prior test levels were low, (2) every two years if radon mitigation was completed after the prior test, and/or (3) during renovations that may affect exposure, such as foundation repairs. Radon testing and mitigation is conducted by **[licensed (if applicable in your state) or certified]** individuals between November and March during normal school day operation in all rooms in contact with the ground and in 10% or more of upper floor rooms. Follow-up testing is completed in rooms that have radon ≥ 4 pCi/L using a continuous radon monitor, whenever possible, to evaluate levels during occupancy. If elevated radon is confirmed, mitigation is completed, and the buildings are re-tested to verify radon reduction.

Further information, including **[radon test results and mitigation]** conducted in district buildings, can be found in **[state the location]**.

Coordinating IAQ and Energy Management: Key Questions

How does the district evaluate whether building renovations, especially those involving the building envelope, trigger the need for post-project radon testing?

- **Why?** Sealing the building envelope may increase levels of indoor contaminants, including radon. Adequate ventilation must be provided to dilute and remove indoor pollutants. Radon mitigation systems may become necessary after building envelope changes; testing for radon after envelope improvements can indicate if further action is needed.

Resources

Radon in Schools, U.S. EPA
Guidance on when, how, and why to test for radon in schools.

Radon in Schools: Overview of State Laws, Environmental Law Institute
Overview of state laws that address radon in schools.

Radon Barriers, IAQ Design Tools for Schools, U.S. EPA
Design strategies for high radon potential areas.

Protocol for Conducting Measurements of Radon in School and Commercial Buildings, ANSI/AARST
Standard of practice for measuring radon concentrations in non-residential buildings.

Radon Measurement Guidance for Schools, American Lung Association
An overview of the expectations, measurement process and requirements for radon testing.

ANTI-IDLING

School bus idling pollutes the air and can significantly impact health, especially in children with developing respiratory systems. Diesel exhaust is designated "carcinogenic to humans" by the International Agency for Research on Cancer and contains high levels of particulate matter that can lodge deep into the lungs. Schools can take action to reduce the amount of air pollution caused by idling vehicles by establishing anti-idling policies for school buses and cars. A 2013 study found an anti-idling campaign at a Cincinnati school was able to cut average fine particulate matter ($PM_{2.5}$) concentrations outside the school by 75%. Contrary to popular belief, engine idling emits more dangerous emissions than restarting an engine. Even in cold weather, bus engines do not need more than a few minutes to warm up. Idling also causes twice the wear on internal parts compared to driving at regular speeds and unnecessarily wastes fuel. In addition to implementing anti-idling policies, school systems may consider transitioning from diesel to electric school buses, which have zero tailpipe emissions. Supplementary heaters can be used to warm buses in colder climates while using significantly less fuel than idling.

MODEL IAQ PLAN LANGUAGE

ANTI-IDLING

Delivery and bus pickup and drop off zones have been located away from building outdoor air intakes to ensure that exhaust fumes do not enter the facility. **[School district's name]** prohibits buses and other vehicles from idling while waiting to pick up or drop off students. Buses shall idle no longer than the time required to bring engines to proper operating temperature and to defrost all windows, generally 3-5 minutes. School bus drivers should be provided an indoor waiting space to keep warm to reduce the need for idling. The school district's anti-idling policy is located in **[location]**. **[(If applicable) The district's practices are aligned with local and state anti-idling regulations, including [list regulations]]**.

Coordinating IAQ, Transportation, and Energy Management: Key Questions

Has the district explored opportunities to reduce fleet emissions through electrification or alternative fuels?

- **Why?** Electric school buses have zero tailpipe emissions of any pollutant, reducing students' exposure to dangerous diesel exhaust and resulting in less than half the greenhouse gas emissions than traditional and propane buses.

What is our process for evaluating vehicle replacement or procurement decisions in terms of emissions, IAQ impact, and lifecycle cost?

- **Why?** Operating an electric bus can result in over $100,000 in lifetime fuel and maintenance savings, compared to an equivalent diesel bus.

Resources

Idle-Free Schools Toolkit, U.S. EPA
Information to run an effective idling reduction campaign at a school.

School Bus Idling Policy, U.S. EPA
A template schools can use to develop a school bus idling policy.

Vehicle Idling at Schools: Overview of State Laws, Environmental Law Institute
Overview of state laws that address radon in schools.

School Bus Electrification, World Resources Institute
Guidance on transitioning to an electric school bus fleet.

TOBACCO AND VAPE-FREE SCHOOLS

While smoking tobacco products has been banned in K-12 public schools since 1994, the use of e-cigarettes, which often contain highly addictive and harmful chemicals, has significantly increased. As of 2023, all states prohibit the sale of e-cigarettes to under-aged persons, and 19 states have banned indoor use of e-cigarettes in public buildings. School system policies around smoking and e-cigarettes can further prohibit the use of these products on district property, vehicles, and at school-sponsored events.

MODEL IAQ PLAN LANGUAGE

TOBACCO AND VAPE-FREE SCHOOLS

[Law or school district's name] prohibits tobacco use in all district facilities, on district property, and in district vehicles. These prohibitions apply to all employees, students and visitors at any school-sponsored instructional program, activity or athletic event held on or off district property. The prohibition includes lighted or heated product containing, made, or derived from nicotine, tobacco, and/or marijuana, that is intended for inhalation or chewing.

Resources

Tobacco-Free District Model Policy Language, American Lung Association
Model policy prohibiting the use of all tobacco products.

Freedom From Nicotine and Tobacco: Guide for Schools, World Health Organization
Step-by-step guide for implementing a tobacco-free school policy.

MOLD AND MOISTURE

Moisture problems in school buildings, often result from delayed maintenance. Sources of moisture and humidity problems in school buildings vary widely. Often, issues stem from roof and plumbing leaks or excess humidity resulting from improperly sized or poorly maintained HVAC systems. Temporary structures like trailers and portable classrooms are especially prone to mold and moisture problems. Additionally, cleaning practices that increase humidity, such as carpet extraction, should be limited during the humid summer months to avoid the potential for mold growth. As extreme storms occur in more locations around the country, schools are also seeing the need to prepare for impacts from flooding events. In all cases of mold issues, it is essential to address the source of the moisture before completing mitigation to prevent recurrence. Implementing routine inspections and training staff and teachers to prevent, identify, and report moisture and mold issues are crucial for swift corrective action to protect student and staff health.

Phelps Elementary School | LEED Gold | Rockland, Massachusetts | Photo: Raj Das

MODEL IAQ PLAN LANGUAGE

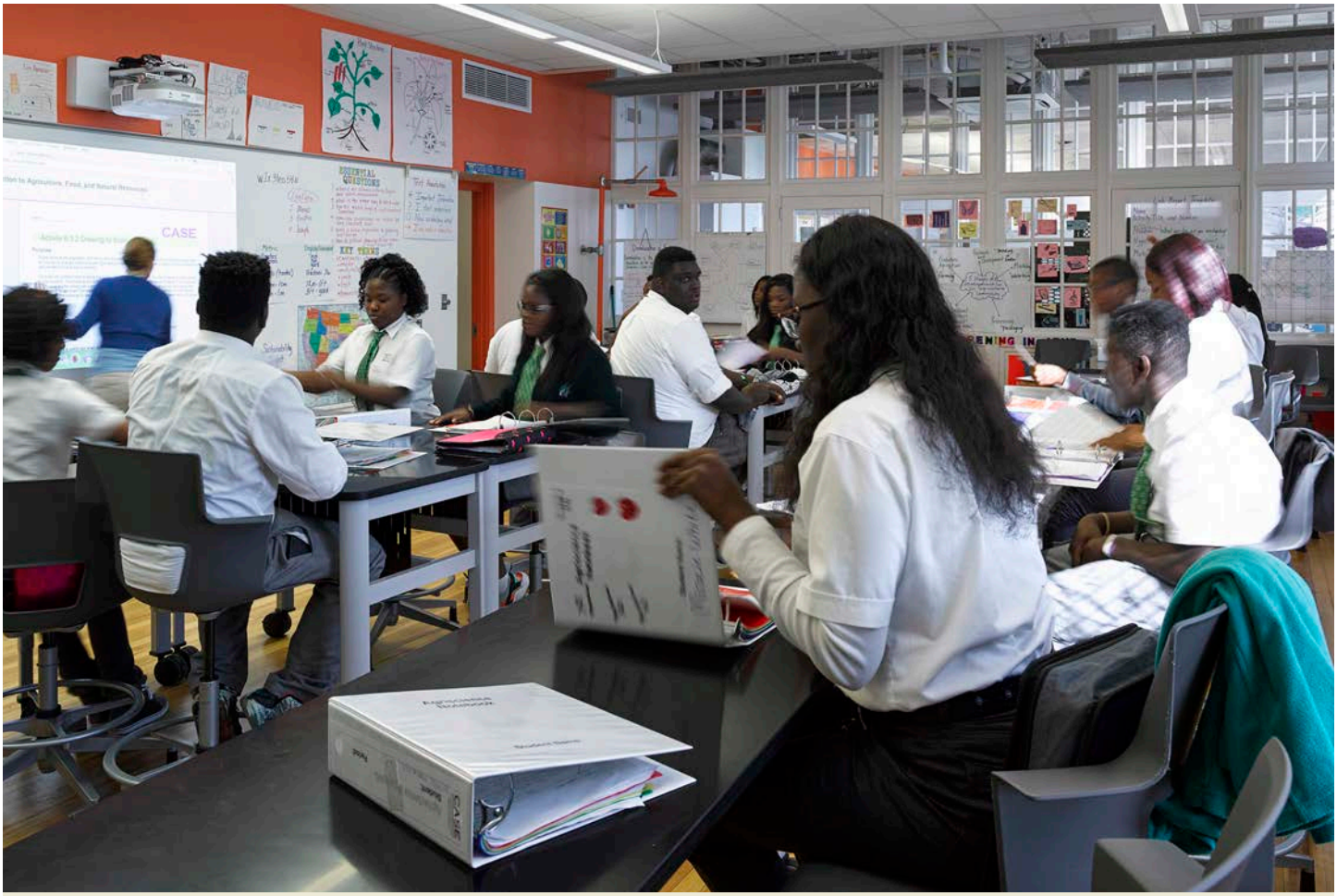
MOLD AND MOISTURE

[School district's name] staff pay close attention to water intrusion and microbial growth during the walkthrough inspections, buildings systems evaluations, and preventive maintenance. The maintenance staff have received basic training about identifying moisture problems. School staff are expected to report and address problems immediately or within 24 hours. During the summer months and extended breaks, an identified staff member will conduct a weekly walkthrough to identify and report potential moisture issues (open windows, odors, high humidity, stained ceiling tiles).

In all situations, the underlying moisture problem must be corrected prior to remediation to prevent recurring mold growth. Relative humidity should generally be maintained at levels below 60% indoors to inhibit mold growth. Carpet cleaning must only be conducted when carpets can dry within 24-48 hours and avoiding high humidity summer months when possible.

Non-porous materials (e.g. metals, glass, and hard plastics) can usually be cleaned. Semi-porous structural materials (e.g. wood and concrete) can be cleaned if structurally sound. Porous materials (e.g. ceiling tiles, insulation, carpet, sheet rock) must be removed and discarded. Damp or wet materials must be dried within 48 hours (preferably within 24 hours). Porous materials contaminated with sewage or overland flooding are always replaced. Mold growth should be removed from non-porous surfaces with a strong brush and non-ammonia containing detergent and thorough drying.

Remediation projects greater than 10 sq. ft. and that cannot be handled by district staff should be contracted to a professional. Large-scale remediation projects may require professional assessment and specific control measures.



Green Street Academy | LEED Platinum | Baltimore, Maryland | Photo: © Tom Holdsworth Photography

Coordinating IAQ and Energy Management: Key Questions

How is indoor humidity monitored and managed during HVAC setbacks, especially overnight, on weekends, or during school breaks?

- **Why?** Temperature setbacks can save energy, but if humidity is not controlled during these periods, it can lead to condensation, mold growth, and costly damage to building materials and furnishings.

Has the district identified oversized and/or short cycling HVAC equipment in certain buildings? What strategies are used to right-size new equipment with more accurate load calculations?

- **Why?** Oversized and/or short cycling HVAC equipment can not only result in significantly higher energy use during the summer months, but can also lead to poor humidity control and mold issues.

Where are HVAC economizer controls currently in use, and do they include humidity sensors or enthalpy controls?

- **Why?** While beneficial for energy savings, HVAC economizer controls can potentially bring in excessive amounts of humid outdoor air. Consider monitoring indoor humidity levels during economizer use and/or adding enthalpy-based economizer controls..

When selecting and installing insulation, what factors are considered to ensure long-term performance and moisture control?

- **Why?** Continuous exterior insulation is preferred over interior insulation as it limits moisture issues and can increase the building's thermal mass for energy efficiency.

What measures are taken to prevent moisture accumulation when upgrading ceiling or roof insulation systems?

- **Why?** When upgrading ceiling and roofing insulation, control for moisture by selecting moisture resistant insulation, properly installing insulation materials, and ensuring that attic spaces are properly ventilated.

During ventilation system upgrades, how does the district ensure ductwork in unconditioned spaces is protected against condensation?

- **Why?** During ventilation system upgrades, ensure that ductwork is properly sealed and insulated to avoid condensation problems when ducts pass through unconditioned spaces.

Resources

IAQ Tools for Schools Reference Guide Appendix H: Mold and Moisture, U.S. EPA
Guidance on mold sources and identifying and correcting moisture problems.

Preventing Occupational Respiratory Disease from Exposures Caused by Dampness, NIOSH
Guidance for schools, including an inspection checklist.

Water Response - IAQ Management Plan, Wylie ISD
Additional sections in plan include procedures for water damage restoration and response.

School mold prevention programs help keep schools healthy, Center for Green Schools
Article outlining elements of effective K-12 mold prevention programs.

CLEANING AND CHEMICALS

INTEGRATED PEST MANAGEMENT

Integrated pest management (IPM) is an effective strategy for pest control, emphasizing the reduction or elimination of pesticide usage through preventive measures. IPM works by obstructing pests' access to school buildings, targeting their fundamental survival needs such as food, water, and shelter. The association between pest exposure and asthma has been widely documented. A 2008-2013 study of seven northeastern public elementary schools found that 99.5% of the schools had detectable mouse allergen and that children's exposure to mouse allergen was significantly associated with an increased number of days with asthma symptoms. Additionally, a 2005 study in North Carolina found that 44% of dust samples in conventionally treated schools had detectable concentrations of cockroach allergen compared to 14% from IPM-treated schools. School systems planning to implement IPM programs may find higher initial costs due to necessary building repairs but may yield long-term cost savings from reduced chemical use. Successful IPM implementation hinges on the education and commitment of all teachers, administrators, and staff to mitigate pest sources actively.

MODEL IAQ PLAN LANGUAGE

Integrated Pest Management

Integrated Pest Management (IPM) is a comprehensive strategy for controlling pests, aiming to reduce the frequency and magnitude of both pesticide use and pest problems. The school district's IPM plan can be found at **[link or physical location]**.

(If applicable) [State name] laws and regulations require all school districts to implement an integrated pest management program. **[Include state specific requirements followed by the school district]**.

Strategies within the district's IPM plan include:

- **[School district's name]** utilizes non-chemical options for pest control wherever possible.
- Individuals that apply certain pesticides must be properly licensed by the **[State]** Department of Agriculture including district staff and contractors.
- Pesticides are only applied indoors during unoccupied times and with supply air set to 100% outdoor air. If pesticides are applied outdoors, by an air intake, this work is also done during unoccupied times and the intake is turned off.
- Landscaping is maintained to reduce pest harborage, including pruning shrubs and trees that are touching walls.
- **[School district's name]** provides staff training and resources on the IPM plan and their role in IPM.
- **[As applicable and consistent with state regulations]** Parents and staff are notified about the application of pesticides except those listed by the EPA as Minimum Risk Pesticide Products. Notifications are posted in the school and at the site of application, and records of school pesticide applications are kept **[list location of records]**.
- Eating in classrooms is limited as much as possible and food must be sealed in hard sided containers.

Coordinating IAQ and Energy Management: Key Questions

What is the district's process for identifying when building envelope improvements are needed across school facilities?

- **Why?** Sealing the building envelope, caulking windows, closing gaps under doors, and repairing leaks are pest management strategies that can also significantly reduce energy use and costs.

Resources

Integrated Pest Management Tools, U.S. EPA
Implementation resources for schools, from model policies to sample contract language.

School District IPM Policies: Model Policy and Examples, CA Dept. of Pesticide Regulation

IPM in Schools: Overview of State Laws, Environmental Law Institute
List of state regulations addressing IPM in schools.

Template School IPM slide deck, Center for Green Schools
Template slides to educate your school community about pest management.

CHEMICAL MANAGEMENT

Safely storing chemicals in schools and school district buildings is essential to protecting student and staff health. Many chemicals are stored throughout school buildings, including cleaning and maintenance products in storage areas, science labs, art rooms, and career and technical education (CTE) workshops. Schools can minimize the risk of student and staff exposure to hazardous chemicals by establishing procedures for conducting inventories, proper storage and disposal of chemicals, and purchasing the smallest quantities of chemicals. Ensuring staff are routinely trained on chemical management procedures— especially emergency response—is critical to an effective chemical management plan. Additionally, spaces where chemicals are stored and actively used should have adequate ventilation and exhaust to the outside.

MODEL IAQ PLAN LANGUAGE

CHEMICAL MANAGEMENT

[School district's name] is committed to promoting safe learning and working environments and has implemented a comprehensive effort to address chemical use, storage, and disposal procedures, as well as the prevention of accidents and spills.

- Applicable staff participate in annual safety training, and students and staff are instructed on necessary safety and evacuation procedures annually.
- Science and lab classes are only conducted in appropriately equipped rooms that include adequate lighting, proper ventilation, fire safety equipment, first aid kits, safety showers, emergency eyewash stations, and spill kits.
- Each school must maintain a chemical inventory updated at least annually and shared with the district **[department names]**.
- Chemicals must be safely stored in minimum quantities in accurately labeled containers in locked locations.
- Expired chemicals and hazardous materials ready for disposal must be disposed of in accordance with federal and state regulations. Contact **[district department name]** for disposal.
- Extremely hazardous chemicals are not allowed in school buildings, such as those that are shock-sensitive or lethal at low concentrations.

Coordinating IAQ and Energy Management: Key Questions

How are chemical fume hoods in science labs monitored to minimize energy use while maintaining safe indoor air quality? What instructions are teachers provided on effective use of fume hoods?

- **Why?** Chemical fume hoods in science labs can result in unnecessary energy use if left running when not being used for experiments. Ensuring that fume hood sashes are closed whenever reasonably possible, adding variable air volume (VAV) exhaust controls, and reducing the number of experiments with hazardous off-gassing could reduce fume hood energy use and improve IAQ.

Resources

Toolkit for Safe Chemical Management in K-12 Schools, U.S. EPA
Templates, tips, and tools for chemical management in K-12 schools.

Managing Your Chemical Inventory Part 1, Part 2, Part 3, NSTA
Guidance for maintaining school science chemicals.

ENVIRONMENTALLY PREFERABLE CLEANING

Environmentally preferable cleaning involves using products and practices less harmful to human health and the environment than traditional cleaning products. Conventional cleaning products often contain high levels of volatile organic compounds (VOCs), which have been associated with the development of childhood asthma. Greener cleaning products can be identified through third-party certifications such as GreenSeal and EPA Safer Choice. Characteristics of green cleaning products can include ingredients that have neutral pH levels and no known carcinogens, low VOC content, minimal packaging, and formulations designed to use less water and energy. Complementary green cleaning practices should be implemented alongside these safer products, including staff training on chemical use, storage, and disposal, proper equipment selection and operation, and scheduling cleaning activities when spaces are unoccupied.

MODEL IAQ PLAN LANGUAGE

ENVIRONMENTALLY PREFERABLE CLEANING

To ensure that cleaning practices contribute to improved indoor air quality, **[school district's name]** has implemented the following guidelines.

PRODUCT SELECTION AND STORAGE

- Custodial staff shall only use cleaning agents approved by the district for school use. All products must be clearly labeled according to OSHA requirements. Bottles of cleaning agents must be tightly closed when stored. Products should be stored in rooms with local exhaust ventilation.
- Environmentally preferable products are used for general cleaning purposes, such as Green Seal certified, EPA Safer Choice (Design for the Environment), UL Ecologo or equivalent products, where cost and performance are comparable to conventional cleaning products. All products will be fragrance free when possible.
- Bleach-containing products are not permitted for use in district buildings as bleach is a high hazard chemical and asthmagen. Whenever possible, safer products with shorter contact times and active ingredients like ethanol, isopropyl alcohol, hydrogen peroxide, lactic acid, or citric acid are procured.
- Microfiber cloths and mops which can be laundered and reused are preferred for effectiveness over cotton or other synthetic materials at removing dirt and organisms.
- Whenever possible, the district purchases energy efficient vacuum cleaners and carpet extraction equipment that are Carpet and Rug Institute (CRI) approved. Powered floor maintenance equipment is selected to operate at no higher than 70 decibels (dBA).

MODEL IAQ PLAN LANGUAGE

CLEANING METHODS AND COMMUNICATION

- All safety data sheets should be stored in an area available to all staff, and the location of this information is communicated in the district's "Employee Right to Know" annual training.
- Teachers and other staff are encouraged to minimize clutter, to ensure rooms are easier to clean and to minimize dust collecting surfaces.
- Ammonia-based cleaning agents and chlorine-containing cleaners (such as bleach) must never be mixed because this generates toxic gases.
- Disinfectants are only used with proper PPE and in well-ventilated areas without students present. Disinfectants will not be sprayed into the air or used in foggers.
- High-touch surfaces are cleaned with soap and water and then disinfected at least once per day. Food preparation and consumption surfaces are cleaned and sanitized surfaces at least once daily, and more frequently as needed.
- HEPA-filtered vacuum cleaners are used to clean carpeting and entry mats.
- Carpets will be cleaned with hot water extraction as needed and at least annually. Carpet cleaning during the summer months will be limited only to spaces with humidity control where the carpet can dry within 24-48 hours to prevent mold and bacterial growth.
- Most cleaning is completed during unoccupied times. Pollutant-releasing activities are restricted by time of day, week, or year. For example, the waxing of floors will be performed **[on Friday afternoons or vacations, to ensure that gases are removed by the time classes resume]**.
- Large walk-off mats must be used to trap dirt and moisture at building entrances. These mats are cleaned according to manufacturers' guidelines to ensure optimal performance.
- Staff are not permitted to bring any cleaning products, pesticides, air fresheners, or other chemicals into schools. **[OR Staff are not permitted to bring in any cleaning products, air fresheners, or chemicals not on the district's approved cleaning products list [link to approved list], including parent donations.]**
- Cleaning staff receive appropriate onboarding training on the safe and effective handling and use of all cleaning products and equipment and on communicating with building occupants about the rationale for procedures. Updated training is provided to staff annually.

Resources

Healthy Green Purchasing for Asthma Prevention, Center for Green Schools

A policy guidebook for schools on selecting and purchasing healthier products.

Healthy Green Schools and Colleges Standard

Certification program for healthy and sustainable school facilities management.

Missouri Green Cleaning Guidelines

Cleaning product and equipment purchasing specifications.

Green Cleaning Program, NY Department of General Services

Step-by-step guides, training, and product lists for implementing a green cleaning program.

Safe Cleaning and Disinfecting Guidance for Schools, WA Dept. of Health

Guidance for selecting and using cleaners and disinfectants in K-12 schools

CONSTRUCTION AND RENOVATION

Taking steps to protect indoor air quality during school building construction and renovations can impact the health of learning space occupants and long-term cost savings. School districts undertaking building renovations can proactively shield building materials and equipment from moisture and debris, which could otherwise compromise IAQ. Additionally, if renovation activities must occur during operating hours, efforts should be made to isolate them from occupied spaces. A 2021 study of 29 Mid-Atlantic schools assessing IAQ pre and post-renovations, including HVAC upgrades and window replacements, found significant decreases in indoor CO2, particulate matter, and CO levels, in addition to improved thermal comfort. Planned building upgrades present an ideal opportunity to address longstanding indoor environmental issues, enhance ventilation and filtration systems, and opt for healthier materials.

MODEL IAQ PLAN LANGUAGE

CONSTRUCTION AND RENOVATION

[School district's name] considers energy efficiency and IAQ when planning construction and renovation projects. Proposed renovations are evaluated in relation to the school's history of IAQ findings and concerns reported, as well as energy performance. In addition, the presence of lead, asbestos, PCBs, mercury, and other possible hazards are evaluated prior to renovation, and school staff comply with relevant regulations.

To the extent possible, major renovations are performed when school is not in session and steps are taken to protect IAQ during renovation activities:

- If renovation projects must be performed while school is in session, the return air from any area being renovated is isolated from the main ventilation system. If projects are on the building exterior, such as a roof replacement, building air intakes are evaluated to understand and mitigate the impacts of fumes on indoor air.
- Ensure that the work areas are under negative pressure using a smoke tube. Plastic sheeting and local exhaust ventilation may be used to minimize the distribution of contaminants produced by construction activities.
- Absorptive materials stored on-site and installed are protected from moisture damage.
- Ventilation systems are not operated unless filters of MERV 8 or higher are installed, and all filters are replaced immediately before occupancy.
- During construction, HVAC supply and return openings are sealed to protect them from construction dust infiltration (e.g., from drywall installation or wood floor sanding).
- Testing and balancing is conducted following HVAC system upgrades, and commissioning is conducted wherever feasible.
- Carpeted and soft surfaces are cleaned with a certified vacuum or high-efficiency particulate air (HEPA) filter vacuum that meets or exceeds the CRI Seal of Approval program after construction is complete and prior to occupancy. For phased, occupied renovations, a HEPA vacuum is used on the carpet daily in occupied areas and in areas adjacent to those affected by construction activities.Painting and drying of adhesives should only occur when the area of the building is unoccupied by students and staff and properly ventilated.
- After construction completion, buildings/zones will be flushed out with the maximum amount of design outdoor airflow for **[# days, running continuously (ex. 3-7 days)]** to remove indoor pollutants prior to occupancy.
- Mobile fossil fuel-powered machinery will not be used indoors.

Coordinating IAQ and Energy Management: Key Questions

What planning procedures are in place to assess and safely manage hazardous materials during energy efficiency upgrades?

- **Why?** Improvements to lighting, roofing, ceilings, and HVAC systems can disturb asbestos, lead paint, PCBs, or mold. Ensure proper planning to remediate contaminants that may be found.

How does the district minimize unnecessary energy use and emissions during construction or renovation activities?

- **Why?** Practices like sealing off conditioned areas from active construction zones and turning off idle equipment and lights can reduce energy waste, control dust migration, and maintain better indoor air quality during projects.

Resources

Construction Indoor Air Quality Management Plan LEED credit, USGBC
Strategies for preoccupancy construction IAQ management.

Energy Savings Plus Health Guide, U.S. EPA
IAQ guidelines for school building upgrades.

Modeled Retrofit Package Performance for Schools, LBNL
Details modeled energy performance from example school retrofit packages by climate zone.

Commissioning, Retro-commissioning, and Ongoing Commissioning for School Air Quality and Energy Efficiency, Center for Green Schools
Slides, resources, and FAQs about commissioning in K-12 schools.

BUILDING MATERIALS AND FURNISHINGS

Building materials and furniture can be significant sources of indoor air pollutants, emitting or off-gassing substances throughout their lifespan. Additionally, schools can choose furnishings and finishes known for their durability, ease of cleaning, and resistance to moisture damage, and reduced carbon footprint, thus preserving IAQ and yielding long-term cost savings. Schools may consider seeking out third-party certifications, such as CRI's Green Label, GreenGuard, EPA Safer Choice, and Cradle to Cradle, to select products with low volatile organic compounds (VOCs) and free of formaldehyde.

MODEL IAQ PLAN LANGUAGE

BUILDING MATERIALS AND FURNISHINGS

The use of environmentally preferable building materials and products are specified in renovation and construction projects wherever possible and where cost and quality are comparable to conventional materials. This preference applies to paints, adhesives, sealants, flooring/carpet, composite wood/panels, acoustical ceilings, insulation, and furniture. Third-party certified products will be specified as available, such as EPA Safer Choice (aka, Design for the Environment), Green Guard, Green Seal, Carpet and Rug Institute Green Label, and ANSI 208 certified. Materials and furnishings are specified to contain no formaldehyde, lead, PCBs, VOCs, and to avoid PVC and antimicrobial coatings.

Easily cleanable flooring is used for high traffic areas including classrooms, hallways, cafeterias, art rooms, restrooms, and anywhere liquid spills are likely. Solid wood and plywood materials are preferred over composite to avoid off-gassing binding materials that are often formaldehyde-based. A minimum of 10 feet of walk off mat system will aim to be provided at every major outside common entryway.

Only latex, water-based, low-VOC paints may be used, as defined for IAQ and not outdoor air emissions standards. Using paints that contain mercury or lead is prohibited. Whenever possible, low emissions classroom writing and art materials will be selected carrying the Art and Creative Materials Institute (ACMI), carrying the AP (Approved Product) seal for non-toxic items. 3D printers, filaments, and their operations will follow UL 200B safety guidance.

Coordinating IAQ and Energy Management: Key Questions

When specifying kitchen equipment, has the district considered Energy Star certified electric appliances over gas-fired models?

- **Why?** Electrifying kitchens eliminates the risk of gas leaks and release of harmful pollutants like carbon monoxide, reduces heat gain and HVAC system demand, and reduces the risk of cooking injuries, all while conserving energy. While cooking itself (including on electric stoves) can release some pollutants, eliminating gas appliances removes a major source of harmful combustion byproducts.

How does the district consider interior colors and surface reflectivity when designing or renovating classrooms and common spaces?

- **Why?** In addition to considering material contents to protect IAQ, the color of the chosen ceiling, walls, floor, and furniture has a major impact on the effectiveness of the daylighting and electric lighting. Choose light colors for interior walls and finishes and specify a minimum reflectivity of 80% for ceiling tiles.

What insulation materials are typically specified through the district's owner's project requirements?

- **Why?** When upgrading insulation, avoid polystyrene foam insulation (boards or spray-applied) that often contain the highly toxic flame retardant HBCD. Spray insulation products often contain significant asthmagens and highly toxic halogenated flame retardants. For board insulation, prefer expanded cork, wood fiber, and unfaced formaldehyde-free fiberglass or mineral wool as they typically contain less-toxic flame retardants and binders.

When replacing or upgrading roof insulation, is the insulation installed entirely above the deck, and how is the attachment method determined?

- **Why?** Roof insulation above the deck is more energy efficient and reduces thermal bridging. Mechanically fastened or ballasted systems are preferred over fully adhered systems to minimize the introduction of VOCs from adhesives.

Does the district select exterior materials, like roofs and metal doors, with high solar reflectivity to reduce cooling loads?

- **Why?** High-reflectivity surfaces lower solar heat gain, reduce indoor temperatures, and decrease reliance on mechanical cooling systems, which can improve comfort and energy savings.

How are IAQ-related upgrades considered alongside energy efficiency and electrification projects during building renovations?

- **Why?** Combining projects such as HVAC controls upgrades with lighting retrofits or system retro-commissioning can optimize costs, minimize disruptions, and could result in 20-25% energy cost savings. Additionally, upgrading HVAC equipment beyond like-for-like with energy or heat recovery (ERV/HRV) ventilation, or dedicated outdoor air systems (DOAS).
- In critical areas, such as school kitchens and bathrooms, where there is high demand for outdoor air ventilation through mechanical systems, installing make-up air systems can help ensure that ventilation rates remain sufficient.

Resources

Informed Product Guidance, Habitable

Building products rankings from red-to-green indicating health impacts of chemicals on building occupants throughout the product life cycle.

Healthy Green Purchasing for Asthma Prevention, Center for Green Schools

A policy guidebook for schools on selecting and purchasing healthier products.

Controlling Pollutants and Sources: Indoor Air Quality Design Tools for Schools, U.S. EPA
Guidance from the EPA about selecting low-VOC emitting materials in schools.

Material Ingredients LEED credit, USGBC
Lists third-party certification programs certifying healthier materials.

K-12 Advanced Energy Design Guide – Achieving Zero Energy, DOE
Establishes a set of energy performance goals and design strategies for achieving zero energy.

EMERGENCY RESPONSE

During emergencies at school district locations, established protocols are crucial for safeguarding the health and safety of students and staff. Indoor air quality-related school emergencies may encompass gas leaks, chemical spills, sudden mold outbreaks, and infectious disease outbreaks. Clearly outlining procedures for evacuation, notifying authorities, providing medical attention, and implementing mitigation steps tailored to each type of emergency is essential for ensuring a prompt and coordinated response.

MODEL IAQ PLAN LANGUAGE

EMERGENCY RESPONSE

Emergencies are defined as situations that require immediate action and could pose a threat to the health and safety of building occupants. In the event of an emergency, the following relevant emergency contacts will be contacted immediately: **[list contacts with the local police/fire protection, poison control, and the local health department.]** IAQ-related emergencies include the following:

- Widespread and sudden complaints of headaches and nausea or combustion odors
  - » Remove individuals from the impacted areas, and report to the Facilities department for prompt investigation of cause.
- Chemical spills or gaseous leaks of hazardous materials
  - » Report major spills to the Facilities department for prompt response. If a spill is an immediate hazard, the school's evacuation protocol will be followed.
- Confirmed infectious air borne disease outbreak (e.g., Legionnaire's, measles, coronavirus)
  - » Follow **[school district's name]** protocols for [protocol name: e.g. rapid response and outbreak prevention], including monitoring illness rates and surface disinfection.
  - » Increase clean air rates in affected buildings in accordance with ASHRAE Standard 241, aiming for a clean airflow rate of approximately 40 cfm/person in classrooms by increasing outdoor air intake, increasing air flow through filtration systems, and/or deploying air cleaners.
- Wildfire or outdoor air pollution event
  - » Close doors and windows and limit time spent outdoors including recess. Turn on portable air filtration units, if available.
  - » Limit outdoor air intake and keep recirculation fans running in accordance with ASHRAE Guideline 44. Adjust outdoor air dampers, disable or reduce relief fan airflow, adjust exhaust fans, and block exhaust grills. If possible, install higher rated MERV filters and/or temporary added pre-filters.

Emergencies are determined on a case-by-case basis, using the above definition as a general guideline only. If doubt exists about whether exposure to a specific hazard constitutes an emergency, a precautionary approach may be used where the matter is handled as an emergency. Details of the **[school district's name]** emergency preparedness and response plan can be found in **[state location]**.

Coordinating IAQ and Energy Management: Key Questions

Which buildings have back-up diesel generators? What measures are in place to ensure generator exhaust is directed away from windows, air intakes, and other openings during power outages?

- **Why?** Generator exhaust contains harmful pollutants like carbon monoxide.

Has the district considered off-grid renewable energy systems or battery storage to maintain essential operations during power outages?

- **Why?** These systems can enhance building resilience by supporting lighting, ventilation, refrigeration, and communications when the grid is down.

Which buildings are designated to serve as emergency shelters? How have HVAC controls, indoor air quality, and energy efficiency been considered for sustained operations?

- **Why?** Buildings designed to serve as emergency shelters require careful planning around energy use, ventilation, and occupant needs.

How have does the district weatherized school buildings to improve energy efficiency and prevent infiltration of outdoor pollutants during extreme weather or smoke events?

- **Why?** Weatherizing and sealing building envelopes minimizes outdoor air pollution infiltration, while also improving energy efficiency.

Resources

Introduction School Emergency Response Plan, DC Public Schools
Example comprehensive district emergency response plan.

Emergency Communications Toolkit, WA Department of Health
Templates, checklists, and fact sheets for preparing emergency response communications.

Schools as Cleaner Air and Cooling Centers Fact Sheet for Facilities Managers, EPA

School IAQ Fact Sheet: Wildfires, Center for Green Schools
Actionable guidance to reduce smoke exposure inside schools and protect occupant health before, during, and after a wildfire.

Wildfire Response Resources, ASHRAE
Guidelines and planning framework for preparing buildings for smoke events.

Preparing Schools for Climate Resiliency, Center for Green Schools
Guide for integrating climate resilience planning into existing district planning structures.

OTHER INDOOR ENVIRONMENTAL QUALITY (IEQ) POLICIES

School districts are encouraged to customize their plans to align with their specific goals, climate, and local regulations. In addition to the IAQ Plan components included in this toolkit, school districts may consider outlining other environmental health plans or policies such as:

Animals and Plants: Outline policies for managing classroom animals and indoor plants to minimize allergens, odors, and moisture-related IAQ issues.

Lead: Include procedures for identifying, managing, and remediating lead-based paint and lead in drinking water to protect occupant health and ensure regulatory compliance.

PCBs: Identify procedures for assessing, managing, and safely remediating polychlorinated biphenyls (PCBs), which may be present in pre-1979 buildings, fluorescent light ballasts, caulking, and building materials.

Extreme heat and/or cold: Detail protocols for responding to extreme heat and/or cold, including HVAC strategies, providing outdoor shade, and communication plans for limiting outdoor activities.

Wildfires/Outdoor Air Pollution Events: Describe preparation and action plans for poor outdoor air quality events, including filtration upgrades, temporary HVAC adjustments, air quality monitoring, and guidance for limiting outdoor activities.

BEYOND IAQ/IEQ: DISTRICT-LEVEL PLANNING FOR HEALTHY, RESILIENT, AND SUSTAINABLE SCHOOLS

Green schools go beyond protecting student and staff health; they are models for reducing environmental impact and preparing all students to lead the world toward a healthier, more sustainable future. School districts that are looking to communicate their commitment to and take further action towards energy management, zero waste, ecosystem health, environmental literacy, and climate resilience benefit from documenting these goals in formalized plans. It's important that these plans be customized to meet the needs of your district, and they could be separate documents or may be combined into a district-level sustainability plan.

Resources

School Board Member Climate Action Toolkit, This is Planet Ed
Template school board climate action resolution, talking points, and case studies for developing a climate action plan.

Making the Case for K12 Sustainability Toolkit, Center for Green Schools
Provides key resources to advocate for the hiring of sustainability staff at schools or districts.

Carbon Neutral Schools Resolution Template and Decarbonization Roadmap, NBI

GreenBVSD Sustainability Action Plan, Boulder Valley School District
Outlines district goals and KPIs for climate action from 2021-2026 including a focus on IAQ.

Climate Crisis Response, Climate Justice and Sustainable Practices Policy, Portland Public Schools
Adopted in 2022, PPS board policy focuses on objectives on emissions reduction, and engagement, resilience, and wellness.