



Energy CLASS Prize – Indoor Air Quality (IAQ)

Module 4 - Identifying Interventions & Communication

December 7, 2023

Presenter: Kudret Ütebay

Mr. Ütebay has over 25 years of experience in the education, research, energy, science, and technology fields. He has supported EPA's ENERGY STAR Commercial, Institutional and Industrial Sectors contract for more than two decades and EPA's Indoor Environments Division IAQ Tools for Schools contract for a decade. He plays a key role in marketing and implementing voluntary and mandatory programs to all public and private sectors by developing key messaging, tools, and resources for a wide variety of audiences at every level of an organization to help them overcome issues. For the past two decades, he has worked closely with organizations to promote a holistic approach to energy efficiency and indoor air quality, wrote articles, and presented at conferences. He developed best practice guidance documents on benchmarking, energy efficiency, and indoor air quality topics that speak to a variety of audiences. He provided training and technical support to hundreds of school districts.

Mr. Ütebay's volunteer work includes the following:

- Technical Advisor to the Green Schools Alliance National Technical Advisory Board since 2008.
- Board of Directors to the Clean Air Partners (Metropolitan Washington Council of Governments) since 2012.



Overview of the Indoor Air Quality Course

- November 28, 2023 – IAQ Terminology & Safety, Liability & Occupant Input
- November 30, 2023 – Surveying the Building & Quantitative IAQ Measurement
- December 5, 2023 – Air Moving Equipment & Hazard Mitigation
- **December 7, 2023 – Identifying Interventions & Communication**
- December 12, 2023 – IAQ Cohort

Agenda

- Part 1 Identifying Interventions
 - Contaminant sources and potential solutions
 - IAQ source control assessment protocols and minimum actions
- Part 2 Communications
 - Effective communication
 - What to do before and during an IAQ issue
 - Reporting

Appendix at the end has additional contaminant sources and relevant resources. Please review those **AFTER** the session as we will not cover them during this session.

Learning Objectives

- 4-1 Identifying Interventions
 - Understand contaminant sources and potential solutions
 - Follow assessment protocols and minimum actions for a healthy building
- 4-2 Communications
 - Communicate effectively on issues, goals, and standards for a healthy building
 - Importance and elements of proper and timely communication

Identifying Interventions

Source Control

Polling Break 1

- Do you have buildings constructed during early 1970s or before?
 - a) Yes
 - b) No
 - c) I do not know

Source Control

We will review the blue highlighted sources. For the rest, please see the Additional Resources at the end of the slide set.





- Moisture Control and Mold
 - Asbestos
 - Lead
 - Polychlorinated Biphenyls (PCBs)
 - Radon
 - Vehicle Exhaust
 - Pests
 - Tracked-In Pollutants
 - Building Products/Materials
- Emissions
- Vented Combustion Appliances
 - Unvented Combustion Appliances
 - Ozone From Indoor Sources
 - Environmental Tobacco Smoke (ETS)
 - Ventilation/HVAC
 - Exhaust Ventilation
 - Building Safety for Occupants

[Source: U.S. EPA Protecting IAQ During School Energy Efficiency Retrofit Projects with Energy Savings Plus Health Guidelines](#)

Energy Savings Plus Health

Moisture and Mold


PRIORITY ISSUE 3.0 MOISTURE CONTROL AND MOLD

ASSESSMENT PROTOCOLS (AP)	MINIMUM ACTIONS (MA)	EXPANDED ACTIONS (EA)
<p>AP 3.1 Inspect for Moisture Problems and Document Results</p> <p>Inspect the interior and exterior of the building and the building's mechanical systems for evidence of moisture problems. Examples of moisture and mold problems include the following:</p> <ul style="list-style-type: none"> • Water damage or stains (e.g., on walls or ceilings) • Foundation cracks that leak water • Signs of seepage or wicking (e.g., efflorescence, peeling paint, delaminating materials) • Visible mold growth • Mold growth in duct work and plenums 	<p>MA 3.1 Repair Moisture Problems</p> <p>Repair moisture problems identified during the assessment (e.g., plumbing leaks; rain leaks, including leaks around windows and flashing; foundation leaks). It is important to correct a moisture problem at its source.</p> <p>MA 3.2 Follow Professional Guidance for Conducting Mold Remediation</p>   <p>Conduct any required mold remediation following professional guidance, such as EPA's Mold Remediation in Schools and Commercial Buildings and Institute of Inspection, Cleaning and Restoration Certification (IICRC) Mold Remediation</p>	<p>EA 3.1 Retrofit Crawlspace</p> <p>Retrofit crawlspaces so that they are sealed, insulated, ventilated with conditioned air, properly drained and waterproofed (see EPA Moisture Control Guidance for Building Design, Construction and Maintenance, and the 2012 International Building Code, Section 1203.3.2). Install a high-capacity, energy-efficient dehumidifier in the space if the climate conditions warrant.</p> <p>EA 3.2 Perform Additional Mold Remediation Activities</p>   <p>Perform additional activities, beyond those required for</p>

United States Environmental Protection Agency

Energy Savings Plus Health:

Indoor Air Quality Guidelines for School Building Upgrades



Source: U.S. EPA Protecting IAQ During School Energy Efficiency Retrofit Projects with Energy Savings Plus Health Guidelines

Energy management and protection of IAQ both should be critical priorities for school facility management!

IAQ TfS Preventive Maintenance Guidance

Healthy, Reliable, Efficient Buildings

- IAQ Technical Solutions

- HVAC and Equipment
- Mold and Moisture
- Green Cleaning and Materials Selection
- Integrated Pest Management
- Source Control
- Energy Efficiency



EPA 402-K-18-001 | March 2019 | EPA Indoor Environments Division | www.epa.gov/iaq



Indoor Air Quality Tools for Schools:
Preventive Maintenance Guidance



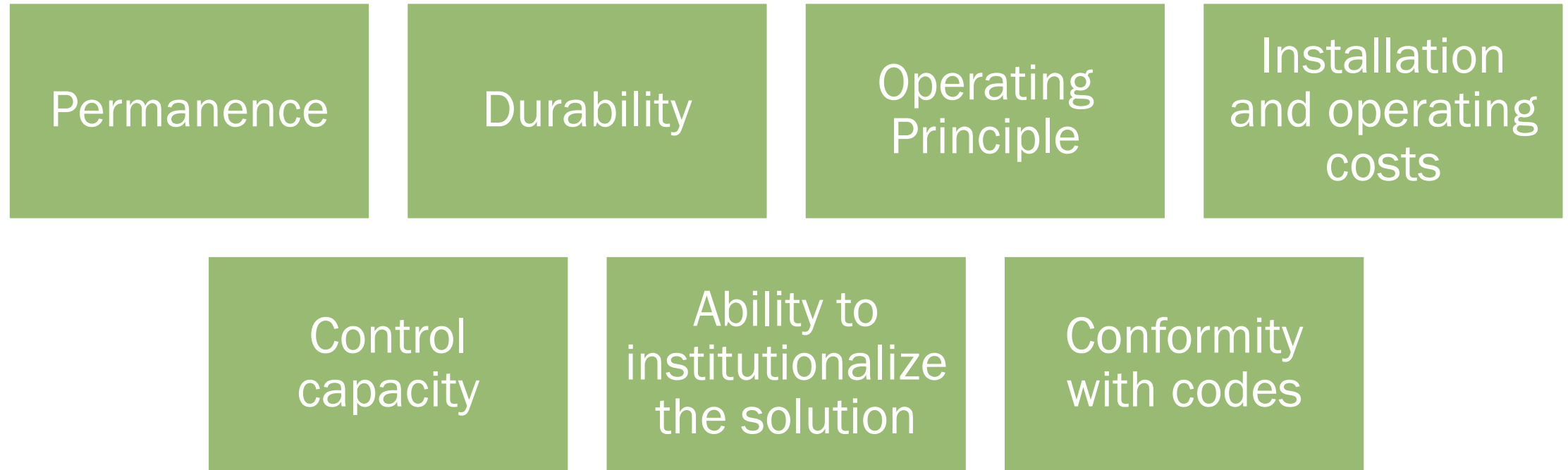
Indoor Air Quality (IAQ)

[Indoor Air Quality Tools for Schools \(IAQ TfS\): Preventive Maintenance Guidance Documents | US EPA](#)

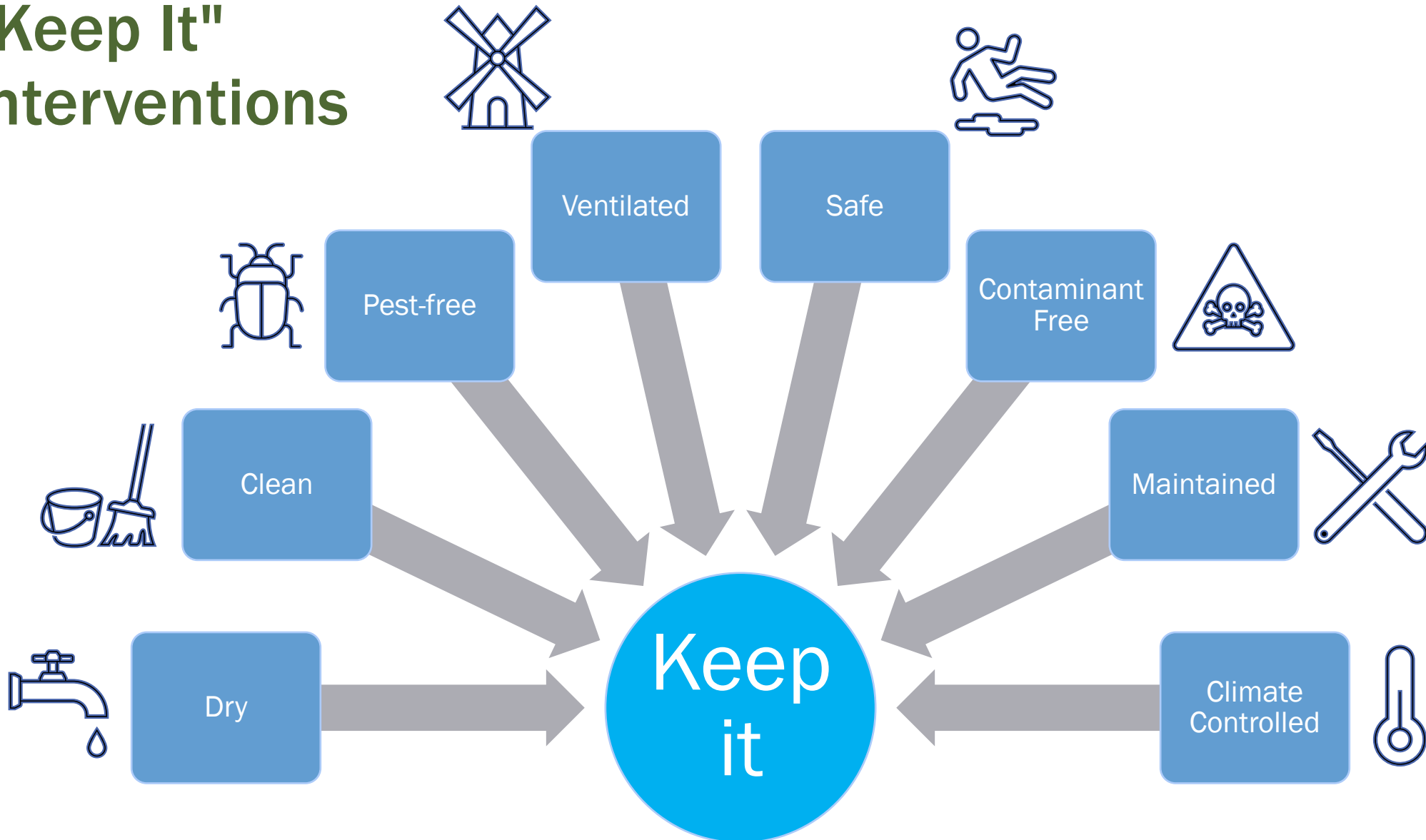
Key Provisions of Codes

- Structural Integrity
- Weatherproof
- Maintenance
- Cracks & Holes
- Loose or Rotting Materials
- Dampness & Deterioration
- Peeling Paint
- Ventilation / Windows
- Infestation
- Sanitation & Trash
- Cleanability
- Heating Systems

Evaluating Solutions



"Keep It" Interventions



Keep Its are here so you can make the connections with other IAQ slides



Moisture Control and Mold

Assessment Protocols

- Inspect and determine mold or moisture control issues
- Define scope to eliminate moisture



Minimum Actions

Repair moisture problems

Conduct mold remediation following professional [guidance](#)

Address standing water problems

Ensure proper HVAC condensate drainage (ASHRAE Standard 62.1)

Insulate valves and pipes

Properly size HVAC system

Source: [U.S. EPA Protecting IAQ During School Energy Efficiency Retrofit Projects with Energy Savings Plus Health Guidelines](#)



Green Cleaning

Assessment Protocols

- Conduct routine inspections (daily at schools and monthly district-wide)
- Assess equipment and cleaning procedures
- Develop a communications plan with a clear process for addressing occupant concerns.

Minimum Actions

Train staff

Follow product labels, use the right amount

Clean and removed dust with vacuums (HEPA filters) or microfiber dusting equipment.

Use foaming spray equipment

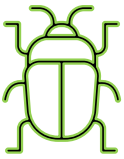
Use safer products (EPA's [Safer Choice](#) or [GREENGUARD](#))

Stored chemical products and supplies in sealed, clearly labeled containers

Find more at [EPA Indoor Air Quality Tools for Schools: Preventive Maintenance Checklist](#)

[Green Cleaning Resource: Safer Choice | US EPA](#)

Source: [U.S. EPA Protecting IAQ During School Energy Efficiency Retrofit Projects with Energy Savings Plus Health Guidelines](#)



Pests

Assessment Protocols

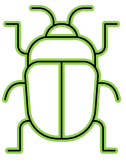
- Identify potential pests
- Assess evidence of pests
- Identify pesticides to be used
- Assess if school has IPM plan

Minimum Actions

- Ensure the school has an IPM plan
- Employ a certified IPM professional. Place signage
- Patch and seal openings with rodent-resistant materials
- Seal and block interior/exterior passageways
- Protect outdoor air intakes and exhausts
- Maintain existing pest protections in building
- Remove clutter in and near building
- Remove soils and mulches against building's exterior walls

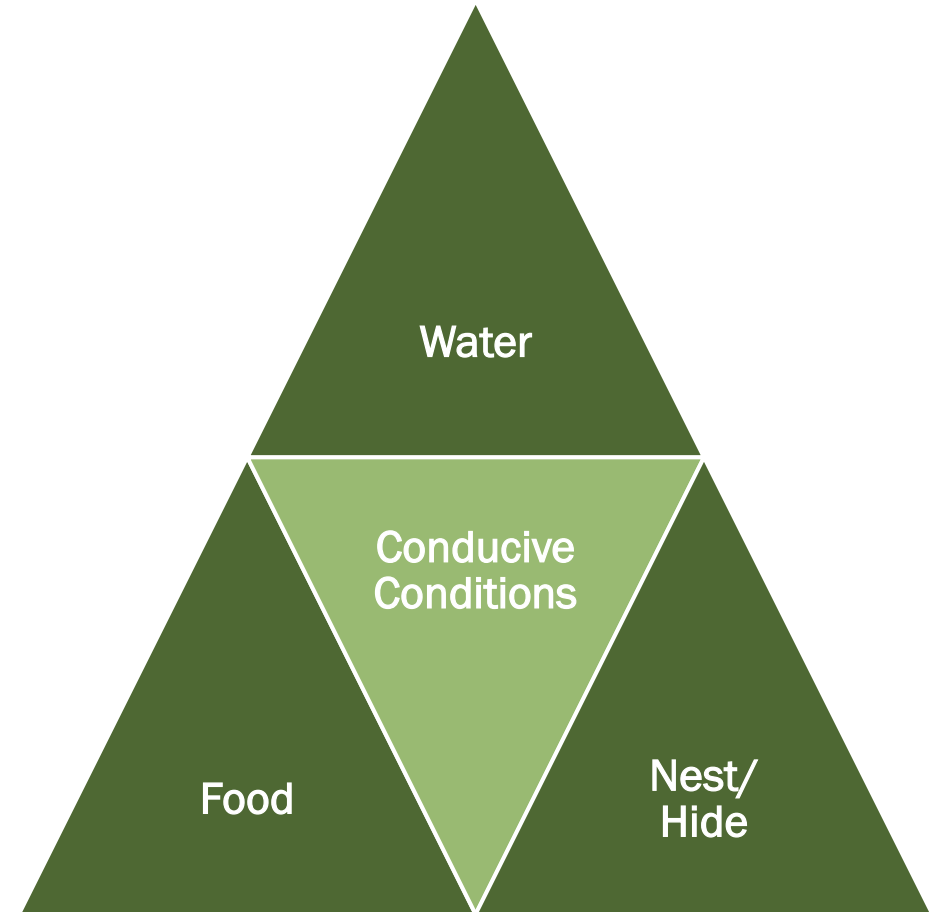
[Integrated Pest Management \(IPM\) Principles | US EPA](#)

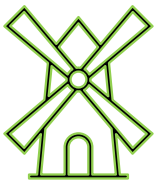
Source: [U.S. EPA Protecting IAQ During School Energy Efficiency Retrofit Projects with Energy Savings Plus Health Guidelines](#)



The Concept Behind IPM

Keep sources away to
keep pests away!





Ventilation/HVAC

Assessment Protocols

- Conduct an HVAC assessment
- See if district has a maintenance plan.
- Determine if HVAC systems comply with ASHRAE 62.1

Minimum Actions

- Schedule regular inspections and have a maintenance program (ASHRAE/ACCA Std 180).
- Install a minimum of MERV 8 filters or higher
- Size and install any new HVAC equipment properly
- Clean air supply diffusers, return registers and outside air intakes.
- Change filters regularly and ensure condensate pans are draining.
- Keep unit ventilators clear of books, papers, etc.
- Find more at [EPA Indoor Air Quality Tools for Schools: Preventive Maintenance Checklist](#)

Source: [U.S. EPA Protecting IAQ During School Energy Efficiency Retrofit Projects with Energy Savings Plus Health Guidelines](#)



Building Safety for Children and Other Occupants

Assessment Protocols

- Identify Health and Safety Officer/Committee
- Document safety hazards
- Assess the proper functionality of fire, smoke, and CO detection equipment
- Identify the harmful chemicals, including mercury
- Identify all fire extinguishers' placements meet local laws
- Determine whether hot water heater temperature setting is within the allowable limits of the local and state codes

Minimum Actions

- Immediately correct life-threatening safety risks
- Correct deficiencies with fire alarms, CO detection and other sensing and safety equipment
- Ensure appropriate storage of hazardous chemicals
- Prepare a mercury spill response plan
- Remove all elemental mercury, mercury compounds and mercury-containing equipment
- Adjust water heater temperatures to prevent scalding

[Source: U.S. EPA Protecting IAQ During School Energy Efficiency Retrofit Projects with Energy Savings Plus Health Guidelines](#)



Keep it Safe (Trips and Falls) Interventions

1. Ensure adequate lighting throughout building
2. Make sure floors/carpets are clean and secure
3. Remove trip hazards
4. Use nonskid surfaces in restrooms
5. Repair broken stairs
6. Ensure secure railings on stairways
7. Install window guards on upper-level windows



Keep it Safe (Fire, Heat, etc.) Interventions

1. Create and practice evacuation plans
2. Make sure properly-placed smoke alarms are working
3. Install properly-placed carbon monoxide alarms
4. Make sure fire extinguisher are in working order
5. Fix faulty wiring
6. Make sure arc fault circuit interrupters (AFCI) are properly installed
7. Keep children away from kitchen areas

Polling Break 2

What do you do
when you see these?

Please insert your ideas
in the chat (e.g. 2-
thoughts) or

Unmute yourself to
briefly explain..



Photos courtesy of the Center for Environmental Health, Children's Mercy Hospital, © 2010.



Asbestos

Assessment Protocols

- Determine areas containing asbestos (ACM)
- Investigate if you have an asbestos management plan (See [Asbestos Hazard Emergency Response Act \(AHERA\)](#))

Minimum Actions

Prepare an asbestos management plan

Evaluate condition of ACM, isolate area, contact an accredited professional for abatement or repair

Do not remove or disturb insulation that appears to be vermiculite

Conduct asbestos abatement before blower door testing

Conduct asbestos clearance air monitoring

Source: [U.S. EPA Protecting IAQ During School Energy Efficiency Retrofit Projects with Energy Savings Plus Health Guidelines](#)



Asbestos

Perhaps, the easiest intervention of all to remember

DON'T DISTURB – CALL IN A PROFESSIONAL TO TAKE A SAMPLE!



Picture credit: [Asbestos | US EPA](#)



Related Topics: [Asbestos](#)

[CONTACT US](#)

Asbestos and School Buildings

Public and non-profit private schools have distinct regulatory requirements to protect school children and school employees from asbestos exposure. This page provides information on these requirements as well as resource materials for schools and parents.

- [Learn Federal Requirements](#)
 - [How Schools Comply with the Asbestos Hazard Emergency Response Act \(AHERA\)](#)
 - [School Asbestos Management Plans](#)
- [Find Resources for Schools and Parents](#)
- [En Español, Información para parientes, maestros y otros empleados escolares](#)

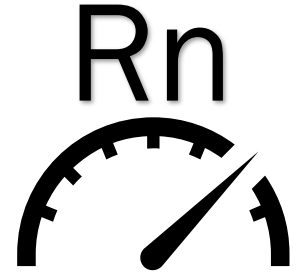
Learn Federal Requirements

[The Asbestos Hazard Emergency Response Act \(AHERA\)](#) and its regulations require public school districts and non-profit schools including charter schools and schools affiliated with religious institutions to:

[Picture: Asbestos and School Buildings | US EPA](#)
[Asbestos and Your Health | Asbestos | ATSDR \(cdc.gov\)](#)



Radon



Assessment Protocols

- Engage a radon testing professional
- Perform radon testing before modifications
- Retest for radon after upgrades

Minimum Action

Mitigate high radon levels. Reduce radon levels if equal to or greater than 4 pCi/L, before or after building modifications

Ensure HVAC systems are operating properly

Advise periodic retesting of areas that have been mitigated for radon

Consult with a professional if you have high levels of radon in your buildings.

[Learn more on radon at schools at https://www.epa.gov/radon/radon-schools](https://www.epa.gov/radon/radon-schools)

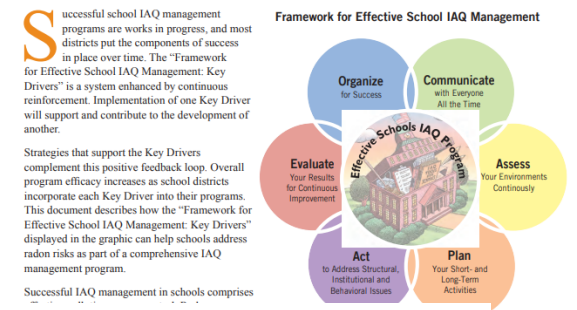
Source: [U.S. EPA Protecting IAQ During School Energy Efficiency Retrofit Projects with Energy Savings Plus Health Guidelines](#)



Radon

The only way to know if elevated radon levels are present is to test!

- Building acts like a vacuum if inside air pressure is lower than pressure in the soil under the foundation drawing radon inside.
- Comes from cracks, openings, floor/wall joints, openings in floor for pipes and wires, and hollow masonry walls that penetrate the floor.
- Fixing these issues will reduce radon levels in your buildings



Addressing Radon Risk Reduction in Schools

Did you know that exposure to elevated levels of radon could be affecting the health of students and school staff in your community?



Radon is the second leading cause of lung cancer and can be found in homes, schools, and buildings across the country. The U.S. Environmental Protection Agency (EPA) recommends that all homes and schools be tested for radon. At least one out of every 15 homes in the United States have an elevated radon level.¹ However, schools are likely to be the second largest source of radon exposure for staff and students since they spend around eight hours inside school buildings five days a week for most of the year.

According to the EPA, a nationwide survey estimates one in five schools has at least one schoolroom with a short-term radon level above the action level of 4 pCi/L (picocuries per liter of air). The EPA estimates that more than 70,000 schoolrooms in use today have high short-term radon levels.²

The good news is that there are ways to reduce the risk of radon exposure among staff and students through radon testing and mitigation. Several states have implemented a protocol for radon testing in schools with remarkable success. School officials can easily test buildings for radon or have them professionally tested. If buildings test high for radon, school officials can reduce radon levels by having a mitigation system installed. There are resources that



Finding a Qualified Radon Contractor

- Contact EPA
 - <https://www.epa.gov/radon/find-information-about-local-radon-zones-and-state-contact-information#radonmap>
 - <https://www.epa.gov/radon/radon-schools>
- Contact a private national proficiency program

AARST-NRPP Radon Professionals Saving Lives

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Members Area Log in

AARST-NRPP professionals utilize ANSI American National Standards and best practices for radon measurement and mitigation; leading the radon community in scientific inquiry, communication, and radon risk reduction.

FIND A RADON SERVICE PROVIDER

Find a Radon Service Provider

Find an AARST Member/Company

Find a Certified Laboratory

AARST-NRPP Professionals can be both Association members and Certified Professionals.

<http://aarst-nrpp.com/wp/>

National Radon Safety Board
NRSB
Certified Radon Professionals

Find a Professional

Home | About NRSB | For Consumers | For Professionals | For Training Providers | Publications | Links | Contact

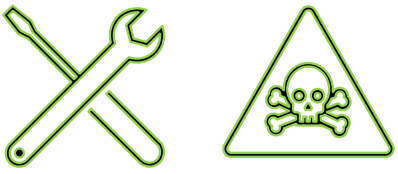
The NRSB seeks to encourage the highest standards of practice and integrity in radon testing and services

NEWS FROM NRSB

Insurance for Certified Professionals
[E&O/General Liability Insurance Available for NRSB Members >>](#)

[The National Action Plan - A Strategy for Saving Lives \(PDF\)](#)

<http://www.nrsb.org/>



Lead

Assessment Protocols

- Assume lead-based paint was used (pre-1978)
- Determine which painted surfaces will be disturbed.
- Test any suspected surfaces
- Engage an EPA-certified inspector or risk assessor

Minimum Actions

Comply with [EPA's Renovation, Repair and Painting \(RRP\) Program](#)

Comply with all local and state regulations

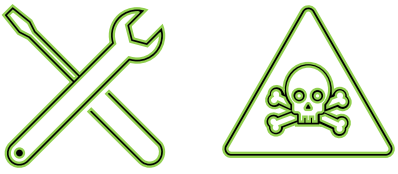
Replace windows that test positive for lead-based paint

Ensure all future paint applications in the school are lead-free



[Picture and Source: Lead | US EPA](#)

Source: [U.S. EPA Protecting IAQ During School Energy Efficiency Retrofit Projects with Energy Savings Plus Health Guidelines](#)



Lead-safe Work Practices

BEFORE renovation, firms must distribute EPA's Renovate Right booklet

DURING renovation

Examples of requirements:

- Work area must be contained
- There must be a thorough clean up



[Renovate Right: Important Lead Hazard Information for Families, Child Care Providers and Schools | US EPA](#)

Key Steps

- **Source removal:**
 - Not allowing buses to idle near outdoor air intakes
 - Not placing garbage near areas with HVAC equipment or intakes
 - Replacing moldy materials
- **Source reduction:**
 - Replacing ozone generating equipment
 - Implementing technology upgrades to reduce emissions from school buses
- **Source substitution:**
 - Selecting less- or non-toxic (low VOC) flooring materials or interior paints.
- **Source encapsulation:**
 - Placing a barrier around the contaminant sources
 - Covering pressed wood cabinetry with sealed or laminated surfaces
 - Using plastic sheeting when renovating to contain contaminants.

Review of Interventions

Module 4-1



Photo: EPA's *IAQ TFS* Preventive Maintenance Guidance

Health and Safety - #1 Rule

Work with accredited professionals

Identify and remove the sources of bad IAQ

Don't disturb hazardous materials

IPM is safer and it works

Test

Ventilate

[Hazard Communication Standard. Safety Data Sheets \(osha.gov\)](#)



Energy CLASS Prize – Indoor Air Quality (IAQ)

Module 4 Part 2 – Communications

Polling Break 1

Does your district have a communications plan?

- a) Yes
- b) No
- c) I do not know

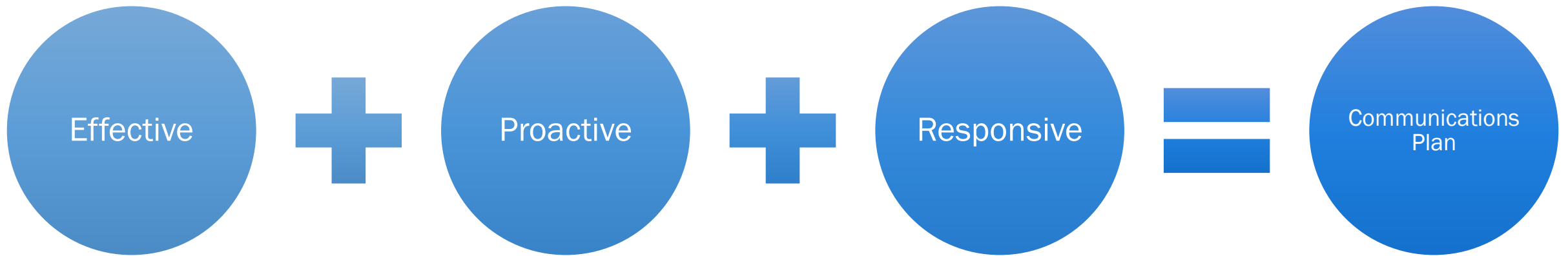
Communications Plan

Effective

Proactive

Responsive

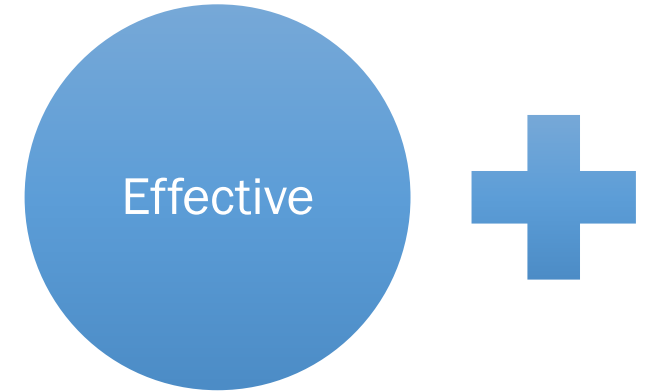
Communications Plan



Source: Energy Savings Plus Health Guide, www.epa.gov/iaq-schools

Communications Plan

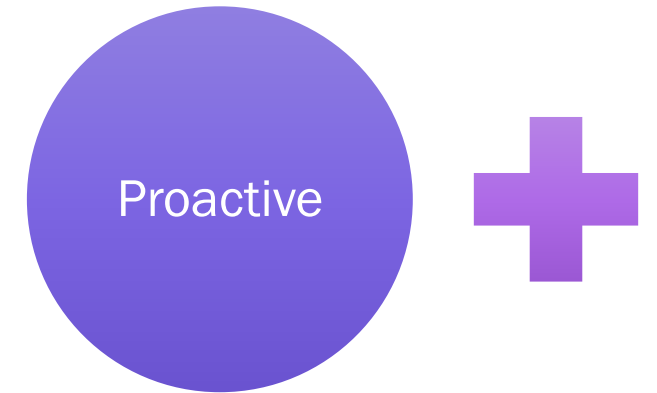
- Effective Communication
 - Diminishes fears
 - Educates your audience
 - Be prompt before, during and after any IAQ issue



Source: Energy Savings Plus Health Guide, www.epa.gov/iaq-schools

Communications Plan

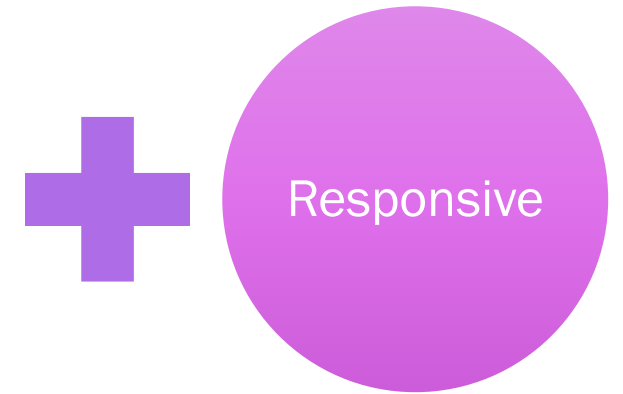
- Proactive Communication
 - Provide accurate information on factors affecting IAQ.
 - Clarify responsibilities and activities of the IAQ Coordinator AND stakeholders, if applicable.
 - Notify occupants and parents of planned activities that may affect IAQ.
 - Employ good listening skill.



Source: Energy Savings Plus Health Guide, www.epa.gov/iaq-schools

Communications Plan

- Responsive Communication
 - Convey basic and important messages
 - School administrators are committed to providing a healthy and safe school.
 - Good IAQ is an essential component of a healthy indoor environment.
 - IAQ complaints are taken seriously.



Source: Energy Savings Plus Health Guide, www.epa.gov/iaq-schools

Communications Plan

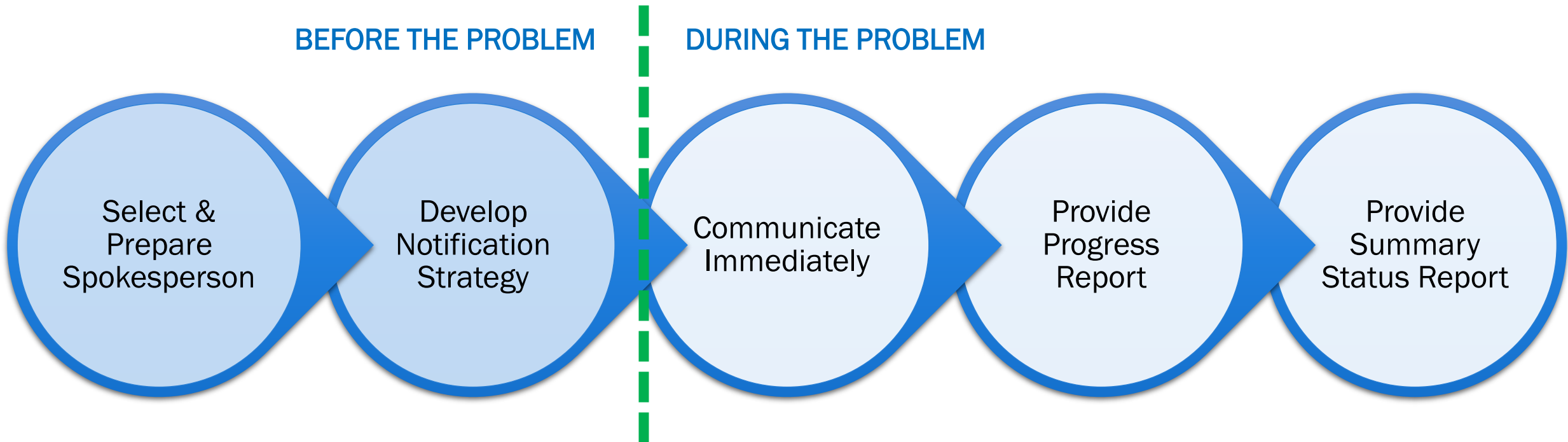
- Responsive Communication – Convey basic and important messages
 - Bad news travel fast!
 - When an IAQ problem occurs, the school community will learn about it quickly.
 - Bad news do not age well!
 - Without open and timely communication, any IAQ problem can become complicated.



Source: Energy Savings Plus Health Guide, www.epa.gov/iaq-schools

Communication Before and During an IAQ Situation

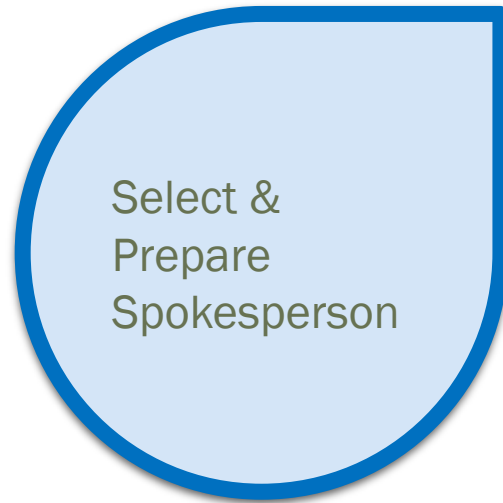
What To Do



Source: Energy Savings Plus Health Guide, www.epa.gov/iaq-schools

Assign Spokesperson

Before the Problem



- Have your spokesperson assigned before any problems arise
- Train the spokesperson
- Enable the spokesperson



Source: Energy Savings Plus Health Guide, www.epa.gov/iaq-schools

Develop Notification Strategy

Before the Problem



- Develop a plan/strategy
- Have templates ready for outreach
- Information needs to be refined to a work plan – step by step that is easily understandable.

Creating a Scope of Work

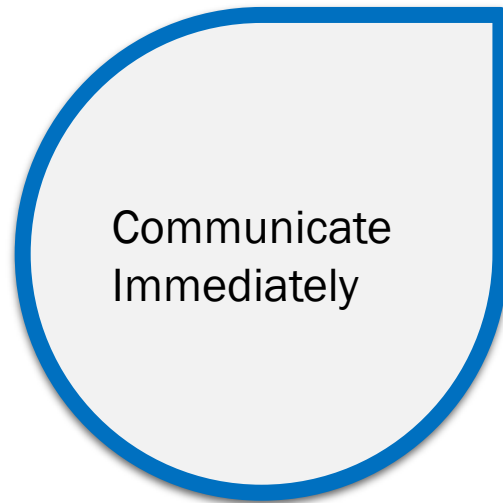
Before the Problem



- Define the work to be accomplished;
- Provide resources for services outside your area of expertise;
- Inform public of your IAQ management plan

Communicate Immediately

During the Problem



- Communicate quickly
- Do not wait until you have all data
- Let the audience know you will provide more information as you have it
- Be honest and open
- Avoid technical jargon
- Provide clear, specific information in the appropriate language (English, Spanish, Korean, etc.)

Building Assessment Report Goals

- Communicate good and bad
- Pair assessments with interventions
- Make messaging easily understandable
 - Multiple levels of understanding
 - Use photos to reinforce issues
- Address occupant and community concerns
- Provide specific actions stakeholders can take, if applicable

Provide Progress Report

During the Problem



- Present initial findings
- Address how you are addressing the issue
- Explain nature of investigative activities

Provide Summary Status Report

During the Problem



- Provide just the right amount of information
- Do not release premature information
- Provide final solutions and results, when information is available

Communicate Test Results

- Usually very confusing
- How results are presented is essential
- Important to understand:
 - Units of measure
 - Accuracy of instruments and methods
 - How to interpret results and what they mean

Detailed Mold Report (WATER-INDICATING FUNGI ARE SHOWN BELOW IN RED)

Analysis Method	Air Analysis			Air Analysis			Air Analysis		
Lab Sample #	52221176-1			52221176-2			52221176-3		
Sample Identification	26826572			26826576			26826571		
Sample Location	BASEMENT			KITCHEN 1st FLOOR			OUTSIDE		
Sample Type / Metric	Air-O-Cell/75.0L			Air-O-Cell/75.0L			Air-O-Cell/75.0L		
Analysis Date	Tue October 09, 2018			Tue October 09, 2018			Tue October 09, 2018		
Determination	PROBLEM			NORMAL			CONTROL		
Fungal Types Identified	Raw Count	Spores / m ³	% of Total	Raw Count	Spores / m ³	% of Total	Raw Count	Spores / m ³	% of Total
*INDOOR PROBLEM FUNGI									
Penicillium/Aspergillus	9,250	123,025	99	---	---	---	---	---	---
**Non-Problem Fungi									
Alternaria	---	---	---	7	93	17	3	40	1
Ascospores	---	---	---	---	---	---	23	306	14
Basidiospores	3	40	<1	1	13	2	---	---	---

Brevard County/Pure Maintenance FL

Elements of Communication

- Communications should include the following elements:
 - Nature of problem, complaints
 - The administration's policy
 - What has been done to address problems
 - What is being done, factors evaluated

Source: Energy Savings Plus Health Guide, www.epa.gov/iaq-schools

Elements of Communication (cont'd)

- Communications should include the following elements:
 - How community can help;
 - How you (plan to) improve IAQ;
 - Remaining/ongoing work;
 - Who can be contacted for information; and
 - When the school will provide the next update.

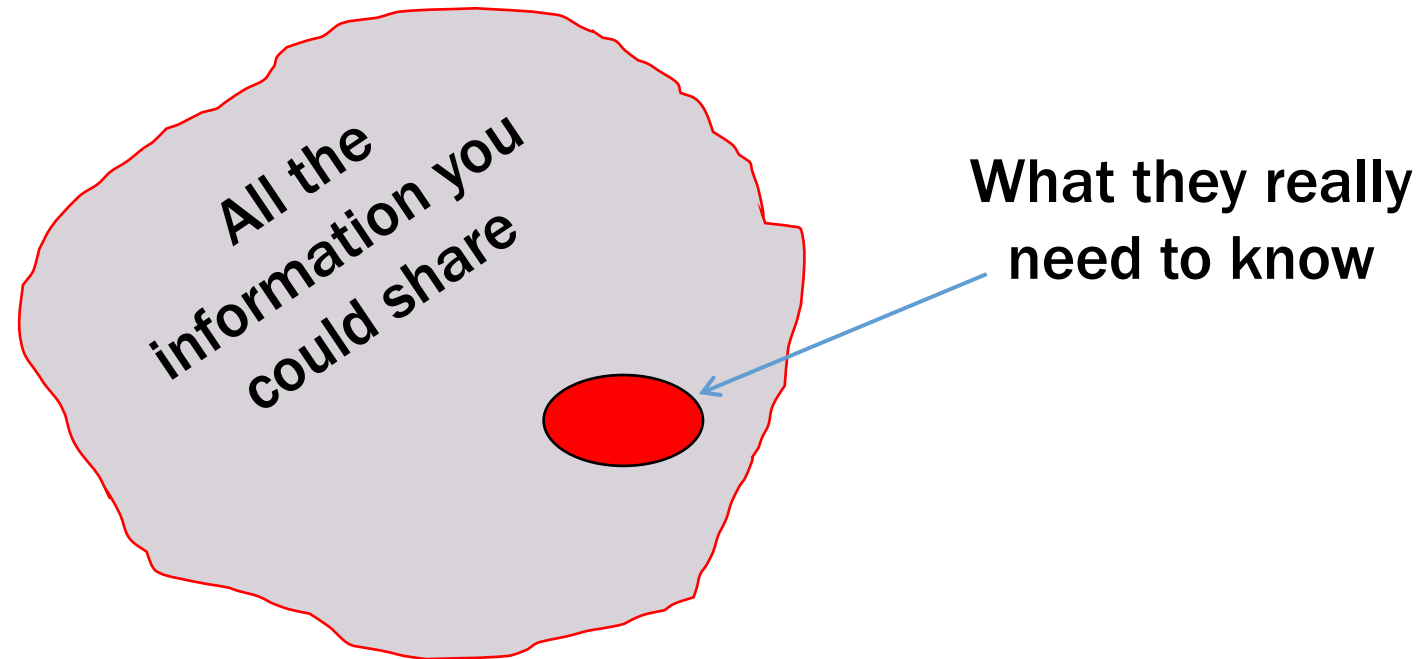
Source: Energy Savings Plus Health Guide, www.epa.gov/iaq-schools

Additional Communication Tips



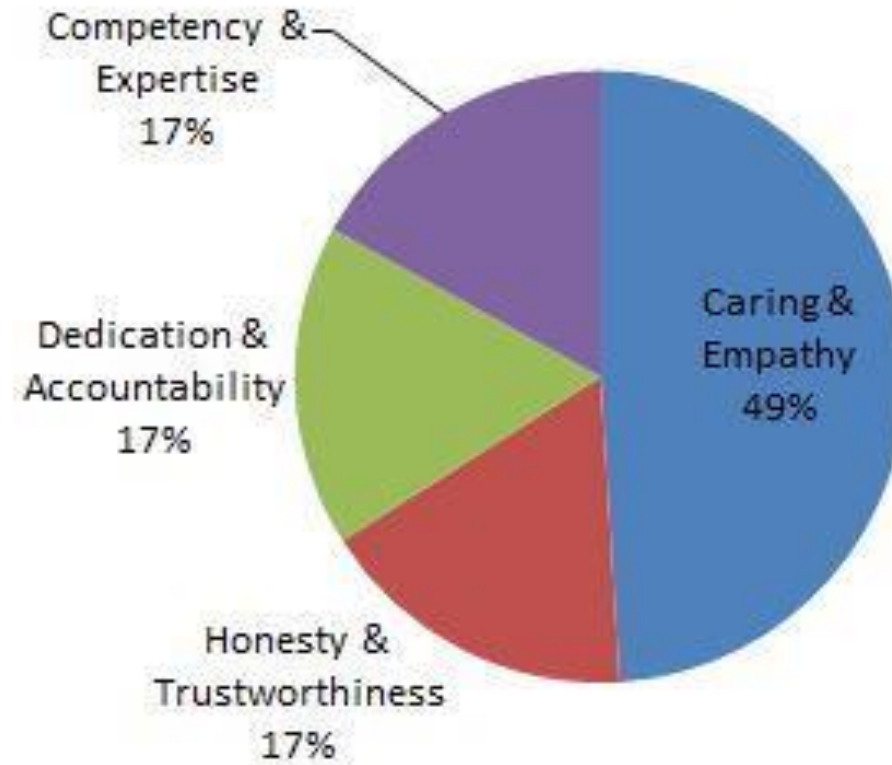
Picture: U.S. Environmental Protection Agency (epa.gov)

Tips - Audience Appropriate



Tips – Inspire Trust

Factors that Inspire Trust

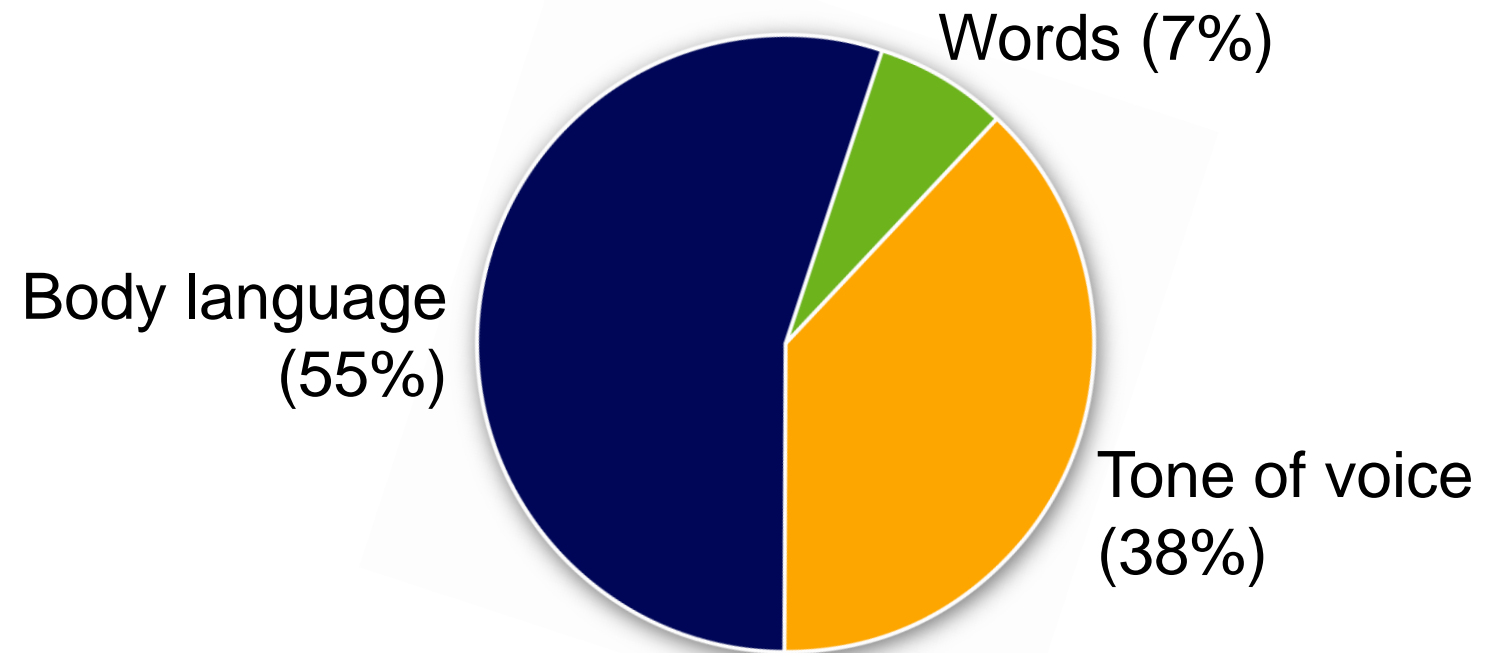


Credit: Institute for Building Technology and Safety

Tips – Feelings and Attitudes

Communication of Feelings and Attitudes

Actions
speak louder
than words!



Credit: Institute for Building Technology and Safety

Tips - Boundaries

- Personal Space
 - Acceptable distance differs widely by culture
 - Violating personal space is threatening

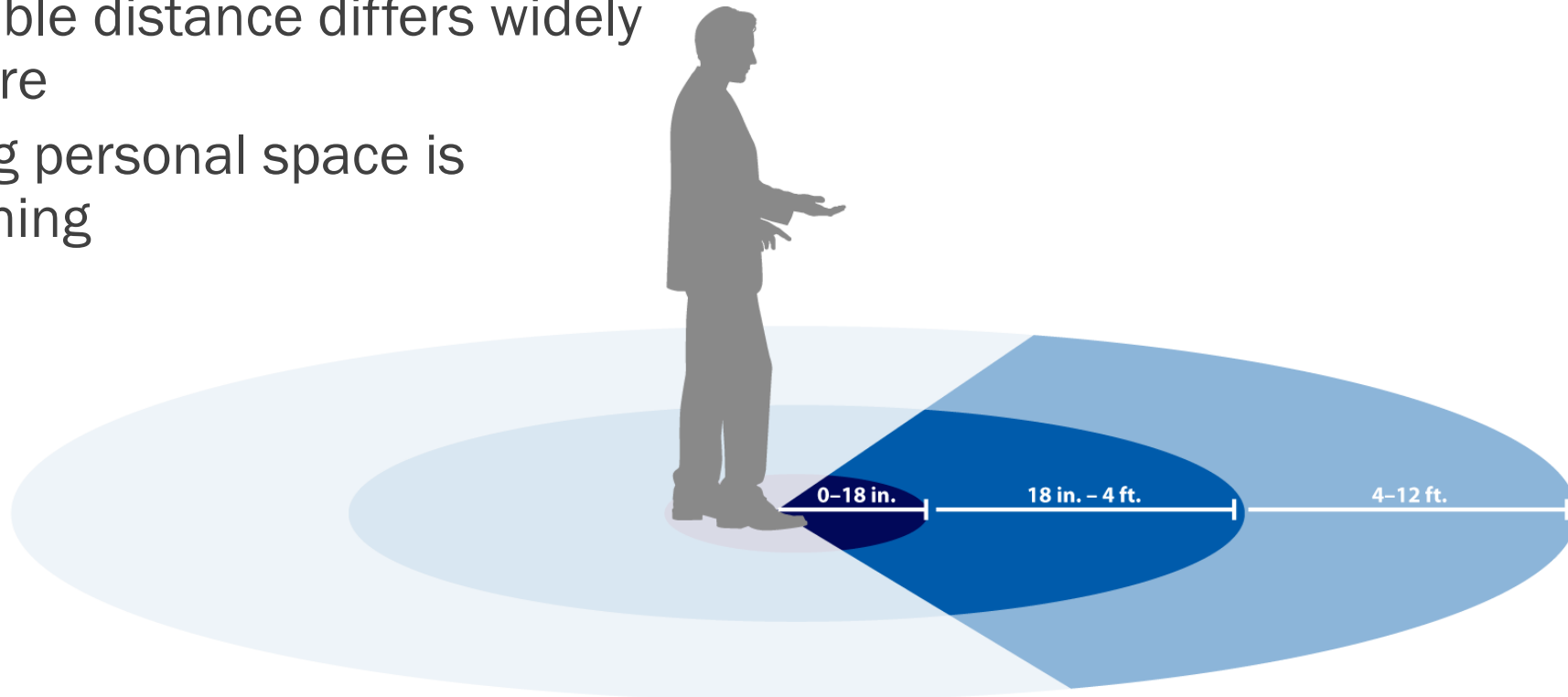


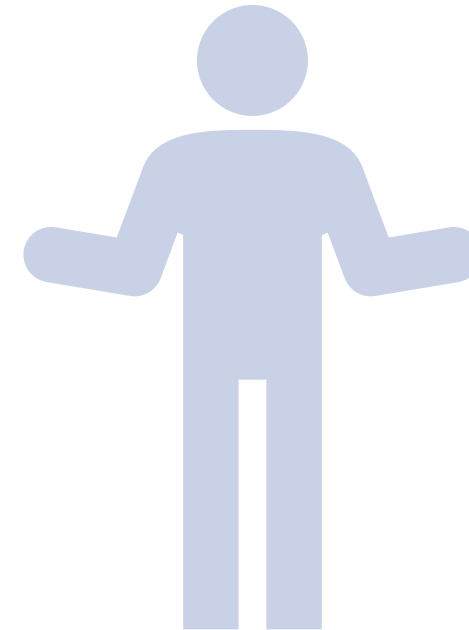
Image developed for the U.S. DOE WAP National Standardized Curricula

Polling Break

What are “people skills”?

- Communication skills
- Tact
- Acceptance of differences
- Humor
- Curiosity
- Good listening skills
- Others?

Can anyone name other people skills?



Please enter your responses in the poll
(word cloud)!

Reporting Elements

Report - Background/Assessments

Background Information

- Contact Information
- Assessment Site Location
- Assessor's contact information

Introduction

- Reason for Assessment
- Assessment Scope of Services

Results of Qualitative and Quantitative Assessment

Conclusions

Recommendations

Limitations

References

Assessment checklists available in EPA's IAQ TfS Action Kit: <https://www.epa.gov/iaq-schools/indoor-air-quality-tools-schools-action-kit>

Report - Results

Background Information

Introduction

Results of Qualitative and Quantitative Assessment

- Sources of good/bad IAQ
- Levels measured
- Risk levels compared to established standards
- Meaning of the measurements

Conclusions

Recommendations

Limitations

References

Report - Conclusions

Background Information

Introduction

Results of Qualitative and Quantitative Assessment

Conclusions

- Set goals for improving the air quality – daily, monthly, yearly.
- Develop a plan to respond to the Keep Its.
- How does this school measure up to other similar schools?

Recommendations

Limitations

References

Communicate

Background Information

Introduction

Results of Qualitative and Quantitative Assessment

Conclusions

Recommendations

Limitations

- Act on all this information.
- Move forward with maintenance.
- Be aware of staff and school limitations

References

Review

Communications

Module 4-2

Communication is a two-way conversation

Bad news do not age well

Bad news **travels** fast

Be quick, frank, respectful

Keep it simple/understandable

Have communications plan in place

Bottom-line

If a plan is recommended, have
that plan in place.

Manage risks to avoid crisis!

Resources

- [Communications Guide \(epa.gov\)](#)
- [Connecting and Networking for Schools](#)
- [Creating Healthy Indoor Air Quality in Schools](#)
- [Protecting IAQ During School Energy Efficiency Retrofit Projects with Energy Savings Plus Health Guidelines](#)
- [Indoor Air Quality Tools for Schools Action Kit](#)

Discussion

Open Discussion and Peer Exchange

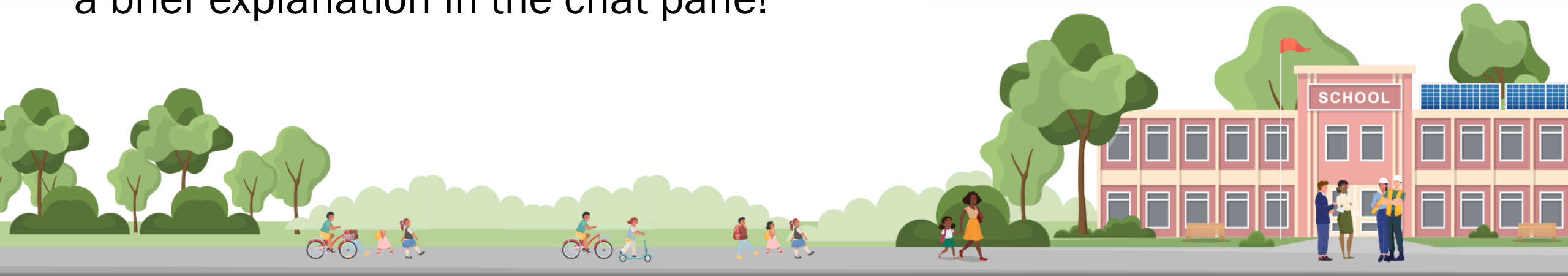
- What is an IAQ issue you experienced in one of your schools?
- How did you handle it (measures and communications)?
- Any best practices for your peers?

Please unmute yourself to provide your experience with the group or enter a brief explanation in the chat pane!

Questions, Discussions & Peer Exchange

- What is an IAQ issue you experienced in one of your schools?
- How did you handle it (measures and communications)?
- Any best practices for your peers?

Please unmute yourself to provide your experience with the group or enter a brief explanation in the chat pane!



Additional Information

Resources

Following Source Control-related Resources slides will not be reviewed during the training and are added as additional information for the benefit of school district officials.

EPA Resources to Get You Started!



IAQ Tools for Schools Action Kit



IAQ Tools for Schools Mobile App



Framework for Effective IAQ Management



IAQ Master Class Professional Training Webinar Series



Energy Savings Plus Health Guide and Interactive Air Quality Planner



IAQ Preventive Maintenance Guidance

www.epa.gov/iaq-schools

Training from US EPA

- [Videos about Indoor Air Quality in Schools](#)
- [IAQ Knowledge-to-Action Professional Training Webinar Series](#)
- [IAQ Master Class Professional Training Webinar Series](#)
- [Healthy Indoor Environments in Schools Webinar Series](#)

"Ventilation Basics"



This video explains the importance of good indoor air quality and shows how to operate and maintain school ventilation systems effectively.

National Resources

- [Operational Guidance for K-12 Schools and Early Care and Education Programs to Support Safe In-Person Learning | CDC](#)
- [Creating Healthy Indoor Air Quality in Schools | US EPA](#)
- [Indoor Air Quality - Schools | Occupational Safety and Health Administration \(osha.gov\)](#)
- [Efficient and Healthy Schools | Department of Energy](#)
- [School-based-health-services-resources.pdf \(hhs.gov\)](#)



Pest Identification Resources

- National Pest Management Association's (NPMA) Field Guide app for identifying pests. Go to Apple Store or Google Play Store to download (costs \$4.99).
- For cockroach identification, go to
 - <https://ecommons.cornell.edu/handle/1813/43848>, click on “found-cockroach-bro-NYSIPM.pdf” under VIEW/OPEN.
- The University of Minnesota Cooperative Extension at:
 - <http://www.extension.umn.edu/garden/insects/find/insects-by-category/#household>.
- The University of Kansas at:
 - <http://entomology.k-state.edu/extension/insect-information/household-pests.html>

Additional Sources Control and Management Considerations

Additional Source Assessments and Minimum Actions

Following Source Control slides will not be reviewed during the training and are added as additional information for the benefit of school district officials.

Polychlorinated Biphenyls (PCBs)

Assessment Protocols

- Determine if PCB ballasts present
- Determine if PCB-containing materials, such as caulk, is present and be disturbed

Minimum Actions

Replace PCB-containing fluorescent light ballasts.
Clean any oil or stains

If PCBs in caulk was disturbed, took steps to minimize exposure (see EPA's Current Best Practices for PCBs in Caulk)

Handle waste properly (PCB and mercury)

Document and store copies of all test results and all disposal measures

[Polychlorinated Biphenyls \(PCBs\) | US EPA](#)



Source: [U.S. EPA Protecting IAQ During School Energy Efficiency Retrofit Projects with Energy Savings Plus Health Guidelines](#)

Vehicle Exhaust

Assessment Protocols

- Investigate complaints, collect/address feedback
- Identify locations of air leaks from parking structures
- Assess whether outdoor air intake vents are located an adequate distance from areas where vehicles may idle.

Minimum Actions

Follow anti-idling laws and policies. No idle zones!

Air seal leaks

Keep positive pressure relative to the parking structures

Decouple areas with vehicle exhaust emissions from building air handling systems

Install CO detection equipment

Ensure outdoor air intakes meet the ASHRAE 62.1

NFPA - National Fire Protection Association

[Source: U.S. EPA Protecting IAQ During School Energy Efficiency Retrofit Projects with Energy Savings Plus Health Guidelines](#)

Tracked-In Pollutants

Assessment Protocols

- Inspect all building entrances for entry mat systems
- Assess dirt or moisture accumulation

Minimum Actions

Provide walk-off mats at all building entrances

Follow EPA's Building and Grounds Maintenance Checklist

[EPA's Building and Grounds Maintenance Checklist](#)

Source: [U.S. EPA Protecting IAQ During School Energy Efficiency Retrofit Projects with Energy Savings Plus Health Guidelines](#)

Building Products/Materials Emissions

Assessment Protocols

- Review content and emissions documentation for products and materials for potentially hazardous compounds.

Minimum Actions

Select the least toxic products or materials

Select low-emitting wood and composite-wood products ([California Title 17 ATCM](#) or Section 6.1 of [EPA's Indoor airPLUS Construction Specifications](#))

Ensure adequate outdoor air ventilation and exhaust ventilation

[Airborne Toxic Control Measures | California Air Resources Board](#)
[Indoor airPlus Construction Specifications \(epa.gov\)](#)

Source: [U.S. EPA Protecting IAQ During School Energy Efficiency Retrofit Projects with Energy Savings Plus Health Guidelines](#)

Vented Combustion Appliances

Assessment Protocols

- Complete a safety inspection of all vented combustion appliances in the school.

Minimum Actions

Repair, remove or replace combustion appliances to correct deficiencies

Ensure that all combustion exhaust is captured as close to the combustion source as possible

Ensure these appliances have sufficient makeup air to replace vented air

Ensure boiler firing adjustments are operating properly

Verify proper installation of CO detection and warning equipment (NFPA 720 & local/state laws)

NFPA-National Fire Protection Association

[NFPA 720: Standard for the Installation of Carbon Monoxide\(CO\) Detection and Warning Equipment](#)

Source: [U.S. EPA Protecting IAQ During School Energy Efficiency Retrofit Projects with Energy Savings Plus Health Guidelines](#)

Unvented Combustion Appliances

Assessment Protocols

- Identify/inventory unvented combustion appliances
- Assess whether any local or state regulations prohibiting these devices apply

Minimum Actions

Meet ASHRAE 62.1

Ensure negative pressure where CO may exist (See NFPA 96 Section 8.2.1)

Remove all unvented combustion space heaters

Verify proper installation of CO detection and warning equipment per NFPA 720 and any local or state requirements

[Source: U.S. EPA Protecting IAQ During School Energy Efficiency Retrofit Projects with Energy Savings Plus Health Guidelines](#)

Ozone From Indoor Sources

Assessment Protocols

- Identify indoor sources of ozone
- Determine equipment designed to intentionally produce ozone

Minimum Actions

Remove any air cleaning equipment that produce ozone

Ensure adequate ventilation and exhaust in areas where ozone might be present

Test office equipment for ozone emissions per [ASTM D6670-01](#) (≤ 0.02 milligrams per cubic meter)

Install office equipment fitted with ozone capture / removal systems

[ASTM D6670-01 - Standard Practice for Full-Scale Chamber Determination of Volatile Organic Emissions from Indoor Materials/Products \(ansi.org\)](#)

Source: [U.S. EPA Protecting IAQ During School Energy Efficiency Retrofit Projects with Energy Savings Plus Health Guidelines](#)

Environmental Tobacco Smoke (ETS)

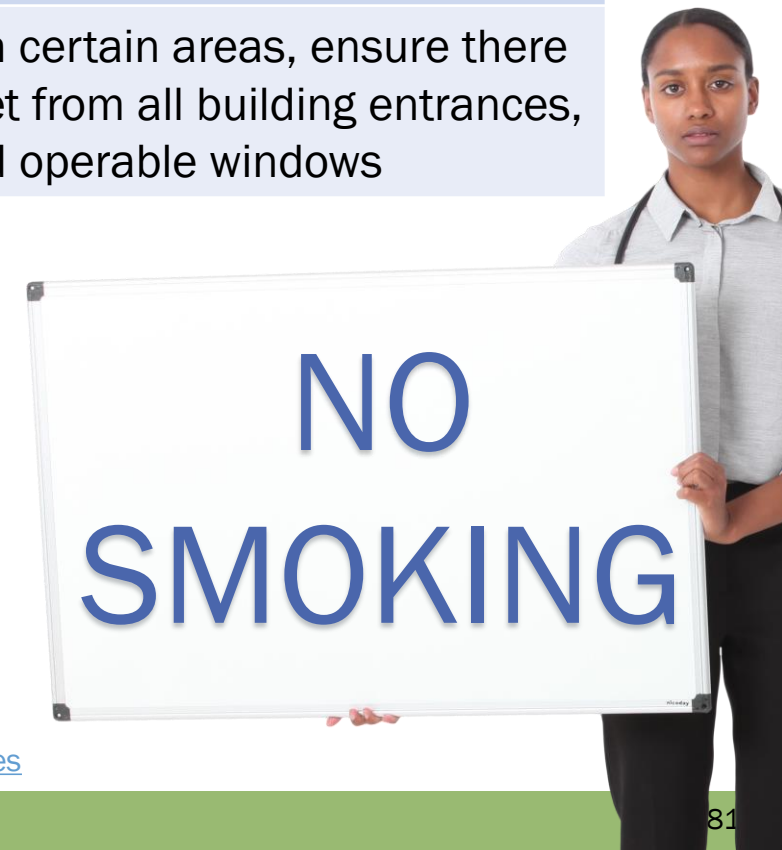
Assessment Protocols

- Assess school smoking policy
- Determine if there are outdoor smoking areas, and their distance from the building's entrances, outdoor air intakes and operable windows
- Identify whether there have been occupant complaints about smoking

Minimum Actions

Ensure consistent smoking policy with local, state and federal laws

If smoking is allowed in certain areas, ensure there is a minimum of 25 feet from all building entrances, outdoor air intakes and operable windows



Source: [U.S. EPA Protecting IAQ During School Energy Efficiency Retrofit Projects with Energy Savings Plus Health Guidelines](#)

Exhaust Ventilation

Assessment Protocols

- Identify areas with localized contaminant sources that require exhaust ventilation
- Measure exhaust airflows to see if they meet ASHRAE Standard 62.1
- Verify that exhaust from rooms discharge outdoors

Minimum Actions

Ensure exhaust is provided for rooms or areas with localized indoor contaminant sources

Ensure that exhaust rates meet ASHRAE Standard 62.1

Confirm proper functionality of the exhaust systems to reduce causes of complaints

Provide monitoring and alarms for exhaust systems

[Source: U.S. EPA Protecting IAQ During School Energy Efficiency Retrofit Projects with Energy Savings Plus Health Guidelines](#)