



## INDOOR AIR QUALITY

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Fall School EHS Workshop 11.7.2023

# Washington State Department of Health School Environmental Health & Safety Program

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## Our Mission

To protect and improve the  
Environmental Health and Safety  
condition of schools in Washington state.





# School Environmental Health & Safety

- **Animals**
- **Control of Communicable & Zoonotic Diseases**
  - Disinfection and Green Cleaning
- **Hazardous Chemicals**
  - Arts, Science Labs, CTE
- **Indoor Air Quality**
  - Asthma, Mold, Ventilation, Filtration
- **Injury Prevention**
  - Athletics, Playgrounds, Fall Protection
- **Integrated Pest Management**
- **Lighting**
- **Noise**
- **Thermal Comfort**



# DOH School Environmental Health & Safety Program

## Provide technical support & training

- Local Health Jurisdictions (LHJs)
- Schools

## Authority

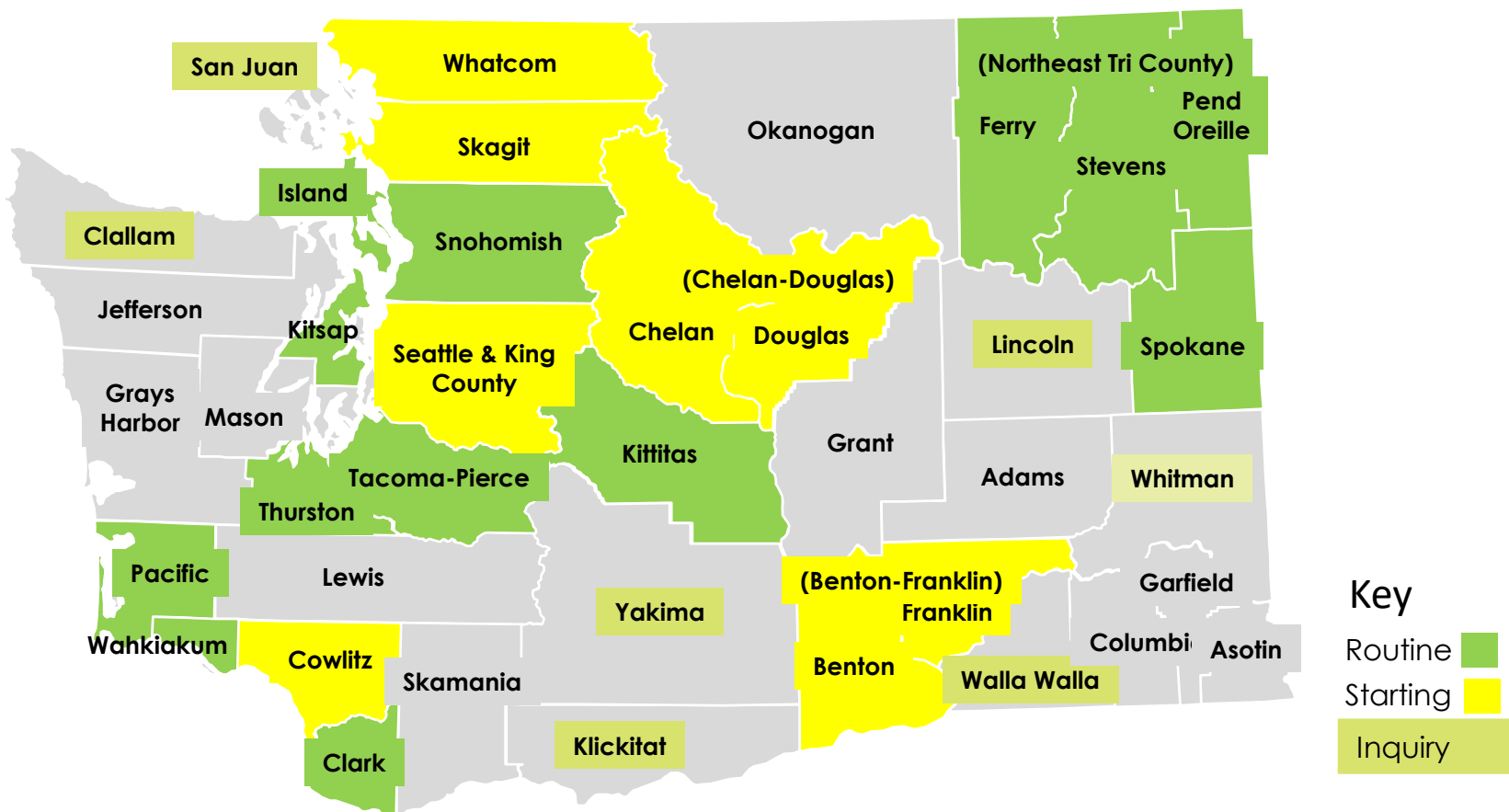
- RCW 43.20.050(2)(c) Adopt rules controlling public health related to environmental conditions **including but not limited to heating, lighting, ventilation, sanitary facilities, cleanliness and space in all types of public facilities including but not limited to** food service establishments, **schools**, institutions, ...
- **State Board of Health [Chapter 246-366 WAC](#):**
  - [Chapter 246-366A WAC](#): Possibly *Effective August 1, 2023*
- **DOH / OSPI K12 Health & Safety Guide**  
2000, 2003 – current edition. Being updated this year.

# How Public Health Helps

- Site Approval
- Plan Review
- Pre-Opening Inspections
- Periodic Inspections
- Consultation
- Outbreak Assistance
- Technical Assistance

# Local Health Jurisdiction

## School Environmental Health & Safety Inspection Programs



- Schools in all counties receive food service inspections, construction plan review and complaint response from their local health jurisdiction.
- 17 LHJs have or are starting school programs with periodic routine inspections. At least 7 more are starting the process of implementing a program.



### What's Happening Now

- [Children and Youth Activity Guide for Air Quality](#)
- [FAQ for Children and Youth Activity Guide for Air Quality](#)
- [COVID-19 Testing in Schools](#)
- [Healthy Youth Survey Registration](#)
- [Register Now - November 7 School Environmental Health and Safety Workshop \(PDF\)](#)
- [School Workshop Agenda \(Word\)](#)

### Key Resources

- [Immunization](#)
- [COVID-19 Guidance K-12 & Child Care](#)
- [Mental and Behavioral Health](#)

## Resources by Topic



[Enhance Safe and Healthy Environments](#)



[Promote Healthy Behaviors](#)



[Manage Health Conditions](#)



[Prevent Injury and Violence](#)



[Promote Healthy Decision Making](#)



[Additional Resources](#)

## Enhance Safe and Healthy Environments

# Enhance Safe and Healthy Environments

[Expand all](#)

**Air Quality**



**Animals and Pest Management**



**Infection Prevention, Cleaning, and Disinfecting**



**Career and Tech Ed, Arts, and Science**



**Contaminants**



**Facility and Construction**



**Playgrounds and Playfields**



**Rules and Regulations**



**Student Health and Safety**



- [School Environmental Health and Safety Workshops](#)
- [Subscribe to Email Updates on School Environmental Health and Safety Information](#)
- [Program and Contact Information for School and Environmental Health and Safety Program](#)



# DOH/OSPI K-12 Health and Safety Guide

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- April 1996 WA State School Facilities Health and Safety Advisory Committee (HSAC) formed
- Final HSAC report issued September 12, 1997
  - LHJ Fee Principles (*K-12 H&SG Appendix K*)
  - Agency Roles/responsibilities matrix (*App. C*)
  - School Inspection Protocols (*App. B*)
  - Draft K-12 H&SG field tested in Thurston, Snohomish and Spokane Counties
- 1<sup>st</sup> Edition – Dec. 2000 (“current” edition Jan. 2003)

The Guide is primarily intended for use by:

- School district staff
- School risk managers and safety officers
- Local health jurisdictions
- Architects and engineers.

# K-12 Health & Safety Guide

<b>A</b>	<b>General Procedures</b>
<b>B</b>	<b>Building Maintenance &amp; Operation</b>
<b>C</b>	<b>General Safety</b>
<b>D</b>	<b>Plumbing, Water Supply, &amp; Fixtures</b>
<b>E</b>	<b>Sewage Disposal</b>
<b>F</b>	<b>Indoor Air Quality</b>
<b>G</b>	<b>HVAC – Preventative Maintenance</b>
<b>H</b>	<b>Sound Control</b>
<b>I</b>	<b>Lighting</b>
<b>J</b>	<b>Food Service</b>
<b>K</b>	<b>Science Classrooms &amp; Laboratories</b>
<b>L</b>	<b>Career &amp; Technical Education</b>
<b>M</b>	<b>Bloodborne Pathogens &amp; Exposure Control Plan</b>
<b>N</b>	<b>Playgrounds</b>
<b>O</b>	<b>Animals in Schools</b>
<b>P</b>	<b>Emergency &amp; Disaster Preparedness</b>
<b>Q</b>	<b>Pesticide Use in School</b>
<b>R</b>	<b>Visual &amp; Performing Arts Education</b>
<b>S</b>	<b>Athletics</b>



# K-12 Health & Safety Guide Appendices

## **PART III**

### **Appendices**

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# Air Quality - Health



[Environmental Factor - May 2021: Indoor air a neglected source of chemical, particulate exposures \(nih.gov\)](#)



# Indoor Air Quality Principals

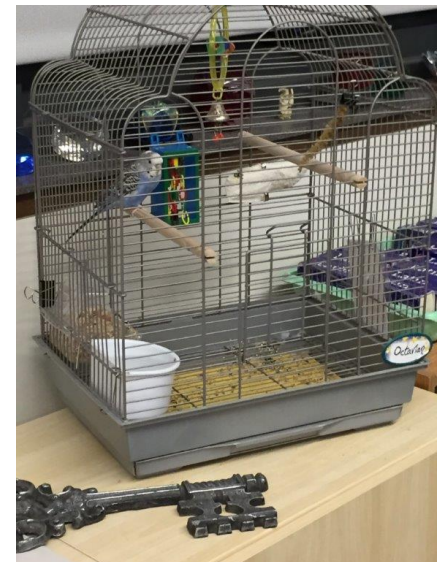
- Source Control
- Ventilation
- “If there is a pile of manure in the room, do not try to remove the odor by ventilation. Remove the pile of manure.”

Max Joseph Von Pettenkofer, 1818-1901



# Zoonotic Diseases Animal Concerns

- *Salmonella*
- Psittacosis (parrot fever)
- Rabies
- West Nile Virus
- Hanta Virus
- Lice
- Bed bugs
- Classroom Pets
  - Policy/Procedures
  - [Compendium of Measures to Prevent Disease Associated with Animals in Public Settings](#)
  - [DOH/OSPI Health & Safety Guide for K-12 Schools](#)
    - Section O, Appendix F



# Animals ≠ Schools

- DOH recommends that animals be visitors for educational purposes, not residents at school.
  - Allergy and Asthma triggers
  - Indoor Air Quality
  - Safety
  - Animal welfare
- Have policy and procedures to address:
  - Service animals (which must be accommodated)
  - Therapy animals
  - Dogs in training
- Guidance: K12 Health & Safety Guide Section O and Appendix F
  - (Birds NOT recommended)



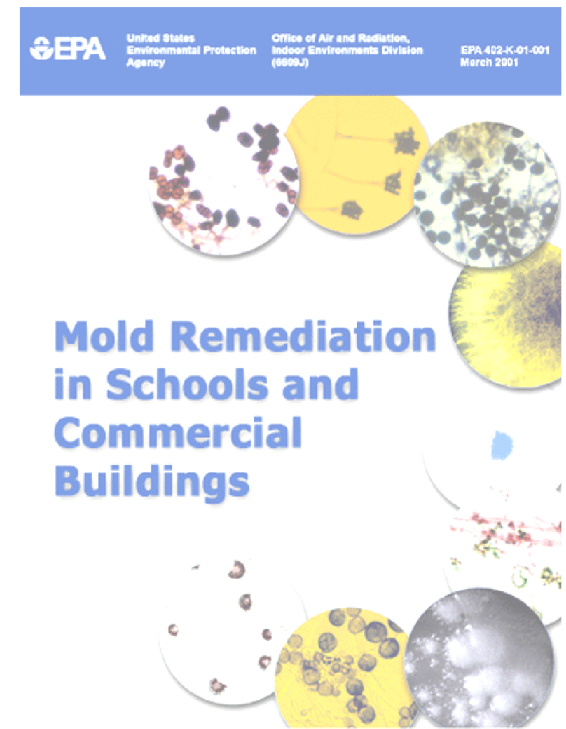
# Integrated Pest Management

- Common sense strategies to reduce food, water, and shelter for pests.
- Create and safe and healthy learning environment
- Reduce pests and pesticide exposure
- Plan review and design for pest-free schools
- Resources and Information
  - WSU School IPM: <https://schoolipm.wsu.edu/>
  - Pest Press: <https://schoolipm.wsu.edu/pest-press/>
  - Pest Prevention By Design Guidelines, SF Environment: <https://sfenvironment.org/download/pest-prevention-by-design-guidelines>



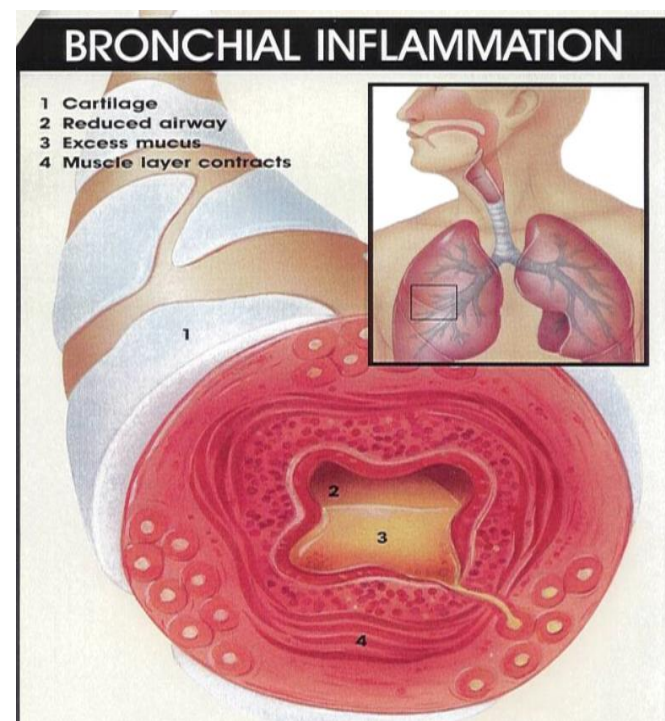
# Mold

- Leaks, inadequate ventilation, poor drainage, Condensation, high humidity.
- Irritation, allergic reactions, infections
- Fix all causes of moisture accumulation
- Prevention – Keep it dry

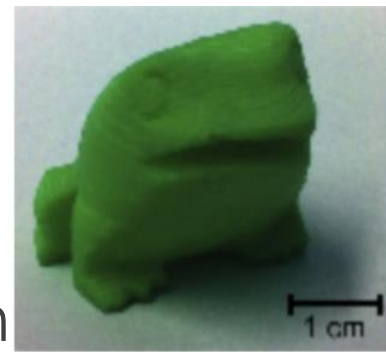


# Control Asthma Triggers

- Door mats
- Avoid clutter / cleanable surfaces
- Limit hanging items/ T-bar clips
- Vinyl/leather furniture
- Animals
- Food storage
- Water based/low VOC markers
- No fragranced products
- No chemicals from home
- Premixed clay
- Carpet cleaning
- Wash stuffed toys in hot water every 2 weeks



# 3D Printers



- Heated thermoplastic extrusion/deposition
- Significant aerosol emission potential
  - “High emitters” of ultrafine particles
  - Gases/fumes
  - Heavy metals
- Provide exhaust ventilation
- **WAC 246-366-080**: “(2) All sources producing air contaminants of public health importance shall be controlled by the provision and maintenance of local mechanical exhaust ventilation systems as approved by the health officer.”
- **Using 3D Printers Safely (wa.gov)**

# Makerspaces

What requires local exhaust ventilation?

What other safety requirements?

**WAC 246-360-080/110/120/140**

- **3D Printers**
- **Laser Engravers**
- Hot Wheels
- LEGO WeDo coding sets
- **Paints**
- **Glue/Hot Glue**
- **Clay/Glazes/Kilns**
- Printers
- Cardboard Cutters
- Sewing Machines
- Circular Knitting looms
- Blenders & Cooking Supplies



**Adequate mechanical ventilation must be provided whenever kilns, paints, glues or other vaporous materials are being used. All sources producing air contaminants of public health importance shall be controlled by the provision and maintenance of a local mechanical exhaust ventilation system.**



# Perfumed, Fragranced, & Scented

- Added fragrances can trigger asthma attacks, allergies, sensitization.
  - People on the autism spectrum are particularly impacted.
- Eye, skin, and respiratory irritation.
- “Fragrance” – a thousand components.
  - Limonene, pinenes, acetone, ethanol, camphor, benzyl alcohol, ethyl acetate, limonene, benzene, formaldehyde, 1,4-dioxane, methylene chloride, acetaldehyde, synthetic musks, phthalates, etc.
- A primary source of indoor and outdoor air pollutants.
- Look for “fragrance-free,” not “unscented”.
- **[Fragrances & Work-Related Asthma \(ca.gov\)](#)**
- American Lung Association Sample Fragrance-Free School Policy  
<http://www.healthyschools.org/documents/fragrance-free-policy-sample-updated.pdf>
- Fragrance-Free Toolkit from UCLA  
<https://csw.ucla.edu/about/fragrance-free/>



# Essential Oils / Natural Air Fresheners

- All air fresheners tested – even those advertised as “natural,” “green,” “organic,” or with essential oils – emitted chemicals classified as toxic or hazardous, including some with no safe exposure level.

Hidden Hazards in Air Fresheners and Deodorizers

<http://www.drsteinemann.com/Resources/Air%20Freshener%20Fact%20Sheet.pdf>

- Persistent exposure to lavender products is associated with premature breast development in girls, according to new research by NIEHS scientists.
- The findings also reveal that chemicals in lavender oil and tea tree oil are potential endocrine disruptors... [https://factor.niehs.nih.gov/2019/9/feature/3-feature-lavender/index.htm?utm\\_source=efactor-newsletter&utm\\_medium=email&utm\\_campaign=efactor-newsletter-2019-September](https://factor.niehs.nih.gov/2019/9/feature/3-feature-lavender/index.htm?utm_source=efactor-newsletter&utm_medium=email&utm_campaign=efactor-newsletter-2019-September)
- Not okay in schools/public places
- Sensitization reactions/asthma
- Respiratory, eye, skin irritation, headaches
- No diffusers, plug-ins, Sensei, candles, etc.
- Particulates/oils spread throughout room
- [Essential Oils - Guidance for Healthy Classrooms \(wa.gov\)](#)

# Keep buses ventilated!



At a minimum, open the front two windows and the second to last two windows at least a few inches.

Do not “fog” buses with chemicals. Clean with a third party certified fragrance-free cleaner.

Disinfect when there is blood, feces, or vomit. Then thoroughly air out the bus.

# Wildfires and Indoor Air Quality in Schools and Commercial Buildings | Indoor Air Quality (IAQ) | US EPA

- Actions that should be taken before and during a smoke event,
- A checklist to determine if the HVAC system is ready for a smoke event,
- Information on how to properly use portable air cleaners,
- An overview of how to determine the safe operation of HVAC systems when using higher efficiency air filters, and
- References and additional resources.

**ASHRAE Guideline 44P Public Review Draft  
Protecting Building Occupants from Smoke During Wildfire and  
Prescribed Burn Events  
First Public Review (August 2023)**



# resources



*Public Health – Always Working for a Safer and Healthier Washington*

# Healthy Air Quality in Schools - Tips for Administrators, Custodians, and Teachers



## Healthy Air Quality in Schools

Achieving healthy air quality in schools takes administrators, custodians, and teachers working together. Good ventilation and source control of pollutants means healthy indoor air quality.

### General Tips

- Teachers and staff need to know who to contact for indoor air quality concerns in the school.
- There should be a written school or district indoor environmental quality plan that includes indoor air quality and integrated pest management.
- Notify school or district indoor air quality contact or maintenance staff if you detect odors or dust from locations such as shops, copy rooms, science labs, laminators, locker rooms, graphic arts, custodial supply rooms, storage areas, combustion equipment, kitchens, or bus exhaust. Document your concerns.
- Immediately report any water leaks, water stains, damp materials, or unusual odors (such as musty or moldy smells) to maintenance staff.
- Maintenance staff should respond to water leaks and moisture problems within 24 hours.
- Relative humidity levels between 30 and 50 percent are better for health. Low relative humidity leads to dry eyes and respiratory irritation. High relative humidity allows dust mites to grow and promotes condensation.
- Dispose of food wastes promptly in covered containers.

### Ventilation

- Operate the ventilation system continually when the school is in use, including during custodial work. Supply at least 15 cubic feet per minute per person of fresh outside air whenever the school is in use. See [WSU Energy Program's Good Ventilation is Essential for a Healthy and Efficient Building \(PDF\)](#). ([www.energy.wsu.edu/Portals/0/Documents/Good\\_Ventilation\\_is\\_Essential.pdf](http://www.energy.wsu.edu/Portals/0/Documents/Good_Ventilation_is_Essential.pdf)).
- An occupied room is considered to be receiving the minimum amount of fresh air when indoor carbon dioxide (CO<sub>2</sub>) levels are approximately 700 parts per million (ppm) over outside ambient CO<sub>2</sub> levels. See [WSU Energy Program's Measuring Carbon Dioxide Inside Buildings \(PDF\)](#). ([www.energy.wsu.edu/Portals/0/Documents/Measuring\\_CO2\\_Inside\\_Buildings-Jan2013.pdf](http://www.energy.wsu.edu/Portals/0/Documents/Measuring_CO2_Inside_Buildings-Jan2013.pdf)).
- Maintain three feet of clearance around unit ventilators and do not put items on top of them to block airflow.
- Change ventilation filters regularly. Use the highest rated, deepest pleat filters the system can accommodate.
- Check to make sure that supply air diffusers, exhaust, and return grills are not blocked. They should be clean and dry.
- Don't turn off unit ventilators – ask maintenance staff to repair noisy units, control temperatures, and control drafts.
- Monitor windows – they should not show condensation except on the very coldest of days.
- Don't allow vehicle idling on school property.
- Maintenance staff should follow integrated pest management strategies. Don't use pesticides in the building.

### Control Asthma Triggers

#### Reduce Animal Allergens, including Dust Mites

- Animals shouldn't be classroom residents and should only come to school for educational purposes.
- Use integrated pest management practices to prevent cockroach and rodent infestations.
- Store food in tightly sealed containers.
- Seal all cracks and crevices.
- Grate all foundation and roof ventilation.
- Use barriers to discourage birds roosting.
- Wash stuffed animals and blankets in hot water every two weeks, or remove them.

### Control Dust

- All outside doors should have large entry mat barriers (walk-off mats) outside and just inside the door. The mats should provide at least four to seven footfalls.
- Maintain cleanable surfaces and avoid clutter. Put loose items into plastic boxes with lids that can be wet-wiped.
- Damp-wipe surfaces weekly with a micro-fiber cloth.
- Don't hang items from the ceiling T-bars without special clips to prevent fraying fiberglass. Remove or clean items when dusty.
- Discourage clutter by removing as many unnecessary dust-collecting items as possible.
- Use pre-mixed and pre-wetted clay art supplies whenever possible to reduce dusts.
- Replace fabric upholstered furniture with furniture easily dusted.
- Remove area rugs that cannot be regularly cleaned and that trap dirt and moisture.

### Reduce Chemicals

- Don't use permanent, solvent-based or scented pens, markers, and board cleaners. Use water-based, unscented, crayon-based, or low-odor items.
- Don't use room deodorizing sprays, plug-ins, scented candle warmers, scented reeds, candles, incense, therapeutic oils, or potpourris.
- Don't use urinal cakes in bathrooms.
- Avoid spray adhesives, contact cement, and volatile paints. If spray adhesives are necessary, use hexane and toluene-free products. Wear solvent-resistant gloves. Spray in an area with local exhaust ventilation and away from children. See [King County's Selecting Safer Art Adhesives](#) ([www.hazwastehelp.org/publications/publications\\_detail.aspx?DocID=z%2F70%2F2BLUUM%3d](http://www.hazwastehelp.org/publications/publications_detail.aspx?DocID=z%2F70%2F2BLUUM%3d)).
- Don't bring chemicals, cleaners, or disinfectants from home. Use only those provided by the school or district.
- Never use air-cleaning devices that generate ozone. Ozone is a respiratory irritant.
- Discourage the use of perfumes, colognes, body sprays and other strongly scented personal care products.
- Hazardous chemicals in laboratories, chemical storages, shops, art rooms, and any other areas need to be properly stored and managed to prevent air contamination.

### Carpet Care

- Whenever possible, don't allow food or beverages in classrooms. If possible, vacuum daily (when children are not present). Use a vacuum with a HEPA (high efficiency particulate air) filter – or use HEPA vacuum bags. Having both is even better.
- Avoid use of area rugs. They can trap moisture and dirt under them. Clean carpets thoroughly with truck-mounted hot water and steam extraction once or twice per year.
  - Spot treat carpet as needed first.
  - Use the minimum amount necessary of low-odor and low-sudsing carpet shampoo.
  - All shampoo and cleaner needs to be thoroughly extracted until the water runs clean.
  - Carpet should dry thoroughly within 24 to 48 hours after cleaning.

### Resources

- [School Environmental Health and Safety, Department of Health](#) ([www.doh.wa.gov/schoolenvironment](http://www.doh.wa.gov/schoolenvironment))
- [School Indoor Air Quality Best Management Practices Manual, 2003 \(PDF\)](#) ([www.doh.wa.gov/Documents/Pubs/333-044.pdf](http://www.doh.wa.gov/Documents/Pubs/333-044.pdf))
- [Integrated Pest Management for Schools, WSU](#) (<http://schoolipm.wsu.edu/>)
- [Creating Healthy Indoor Environments in Schools, EPA](#) ([www.epa.gov/iaq/schools/index.html](http://www.epa.gov/iaq/schools/index.html))
- [Taking Asthma Care To School, Washington Asthma Initiative \(PDF\)](#) (<http://waasthma.org/wp-content/uploads/2014/05/AMES2014Final.pdf>)
- [Art Hazards, King County Local Hazardous Waste Management Program](#) (<http://hazwastehelp.org/ChemToxPesticides/artchemicals.aspx>)

## Cleaning for Health in the Classroom Best Practices for Teachers



School custodial staff is responsible for cleaning schools. Some teachers choose to do additional cleaning. Here is how to ensure those efforts tackle dirt and germs safely and effectively.

### Teach good handwashing habits - the #1 way to keep germs from spreading.

Use plain soap and water for handwashing – before eating, after using the bathroom, after recess, etc. Antibacterial soap is not recommended. Use plain fragrance-free soap. When there is no access to a sink, as on a field trip, alcohol-based (at least 60% alcohol, dye-free and fragrance-free) hand sanitizer or alcohol-based sanitizer wipes can be used. Hand sanitizers are not a substitute for handwashing. They are not effective when hands are dirty or greasy.

Cleaning for Health benefits all

- Lowers absenteeism
- Increases productivity
- Improves indoor air quality
- Reduces asthma and allergy triggers

Good to know:

- Kids are more vulnerable to chemical exposures.
- Many common cleaning products have ingredients that can harm health, especially the lungs.

### Know the difference between Cleaning, Sanitizing, and Disinfecting.

Use the right product for the task:

- **CLEANING** removes dirt and most germs. Use soap and water. A third party certified green cleaner is preferred. In the classroom, cleaning is the focus.
- **SANITIZING** reduces germs to safe levels, for example in food service environments. Food code regulations have specific requirements for sanitizers in the cafeteria and kitchen.
- **DISINFECTING** kills most germs, depending on the type of chemical, and only when used as directed on the label.
- In schools, custodial staff use disinfectants and sanitizers regularly only in high-risk areas – nurse’s office, bathrooms, cafeterias, kitchens, drinking fountains, sink and door handles, and athletic facilities; preferably, when students are not present. Overuse does not provide any additional protection and can expose students and staff to harmful chemicals.

### Teachers can rely on basic *cleaning* to remove dirt and germs in the classroom.

If staff, besides trained custodial staff, needs to assist with classroom cleaning, they should use a school or district provided basic cleaner. A third party certified green cleaner is preferred.

- Custodial staff can make a simple all-purpose cleaner for classrooms. Mix one teaspoon of fragrance-free dish soap in a spray bottle filled with water. Spray on surface and scrub with paper towels or a microfiber cloth. Rinse and wipe dry to remove any residue.
- Microfiber cleaning cloths improve cleaning – the removal of dirt and germs. Dampened with water they are great dust removers. With soap and water, they remove most germs.
- Disinfecting is the responsibility of school custodial staff. They are trained to use disinfectants in a safe and effective manner and to clean up potentially infectious materials and body fluid spills – blood, vomit, feces, and urine. Contact your custodian or school nurse if students are ill and your classroom needs cleaning and disinfection. If teachers use disinfectants, the district must provide training and supply the appropriate cleaner and sanitizer or disinfectant.

Students should never use disinfectants. Disinfectant wipes should not be used to clean hands. This includes Clorox wipes.

If students are helping:

- They should only use soap and water.
- Fragrance-free baby wipes could be used for quick cleaning.
- Most store-bought cleaning products are not safe for children to use.

## Cleaning for Health in the Classroom Frequently Asked Questions



### How does cleaning reduce germs?

Cleaning works by removing dirt and organic matter that contains and protects germs. Soap breaks down oils and allows dirt, contaminants, and germs to be more easily removed. Cleaning with soap, water, and a microfiber cloth will remove most germs.

### Why is handwashing better than hand sanitizer?

Soap and rubbing hands together under running water removes oil, dirt, and harmful surface germs. Hand sanitizer does not remove dirt in which germs hide and only kills a few easy-to-kill ones.

### Why use plain soap for handwashing?

Antibacterial ingredients, in particular triclosan and quaternary ammonia compounds (quats), only kill a few types of germs and are unnecessary when washing hands. It doesn’t matter if germs are alive or dead when they are washed down the drain.

### What about non-alcohol hand sanitizers?

The U.S. Centers for Disease Control and Prevention only recommends hand sanitizers with at least 60% alcohol. Non-alcohol ones are even less effective than alcohol hand sanitizers.

### How does this guidance affect fall classroom supply request lists?

Okay to Request	DO NOT Request
<ul style="list-style-type: none"><li>• Fragrance-free baby wipes.</li><li>• Paper towels (recycled content preferred).</li></ul>	<ul style="list-style-type: none"><li>• Disinfecting wipes.</li><li>• Non-alcohol-based hand sanitizer.</li></ul>

### What are the issues with disinfecting wipes?

- Disinfecting wipes are often overused. They are not appropriate for general cleaning when an all-purpose cleaner or soap and water would suffice.
- Disinfecting wipes (e.g. Clorox, Lysol) usually contain quats and fragrance chemicals. These ingredients can trigger asthma and are associated with adverse health effects.
- Disinfectants can give a false sense of security because when they are not used exactly to label instructions, they don’t work properly. Most disinfecting wipes require the surface to be cleaned first, and then remain visibly wet 4-10 minutes (dwell time) to be effective, requiring multiple wipes.

### Why is it important to use fragrance-free products in school?

Fragrance is one of the most frequently identified allergens, can irritate the respiratory system, cause headaches, and exacerbate asthma.

### What’s so great about microfiber cloths?

Their split fibers create more surface area and are superior for removing dust, dirt, and germs. They are reusable and can be laundered or washed by hand.

### Why should teachers not bring common cleaning products (including bleach) from home into the classroom?

- Some common cleaning products are dangerous when mixed. Never mix bleach with ammonia, acids, or other disinfectants. An example: Comet, containing bleach, would react with Windex, which contains ammonia, to form poisonous vapors.
- Common household cleaners and disinfectants may not be appropriate for schools and may cause allergic reactions or have other health impacts.
- Schools and districts must have a Safety Data Sheet for each chemical used in the school.



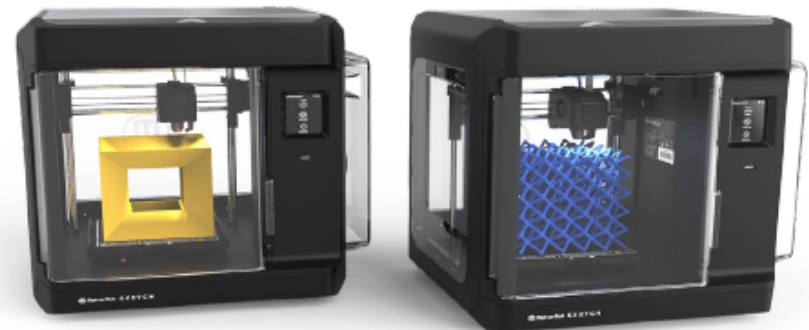
# Using 3D Printers Safely



Three dimensional (3D) printers are a great education tool. They provide rapid prototyping and the ability to create small-scale manufacturing for various lessons in science, technology, engineering, math, and art. Although a great educational tool, 3D printers produce hazardous byproducts including fine and ultra-fine particulates, volatile organic compounds, and heavy metals.

When using 3D printers, required safety precautions protect students from inhaling hazardous particles and chemical vapors and avoid physical hazards such as burns, cuts, and pinches. The State Board of Health Rule for Primary and Secondary Schools, [WAC 246-366-080](#), requires 3D printers to have local mechanical exhaust ventilation.

A recent National Institute of Safety and Health (NIOSH) study evaluated the hazards associated with using different 3D printers and recommended ways to minimize exposure to these hazards. This document focuses on the safe use of fused filament fabrication (FFF) 3D printers (functionally similar to fused deposition modeling, or FDM printers), which are most common in K–12 schools.



Two examples of FFF 3D printers.

[Using 3D Printers Safely \(wa.gov\)](#)



## Healthy Air for Healthy Schools

### Use Only:

- Approved chemicals, cleaners, or disinfectants provided by the school or district. Never bring in products from home.
- Fragrance-free soap and water or fragrance-free baby wipes to clean surfaces. Disinfection is for trained custodians with approved effective products.
- Pens, markers, and board cleaners that are water-based, unscented, crayon, or low-odor.
- Spray paints and spray glues where there is mechanical exhaust ventilation.

### Avoid Products That Reduce Air Quality — Do Not Use:

- Room deodorizing sprays, plug-ins, scented candle warmers, scented reeds, candles, incense, essential oils, or potpourris.
- Air-cleaning devices that generate ozone or are called "ionizers" – ozone is a respiratory irritant.
- Perfumes, colognes, body sprays and other strongly scented personal care products.
- Permanent, solvent-based, or scented pens, markers, and board cleaners.
- Disinfectant wipes.
- Urinal cakes.
- Rubber cement or spray adhesives with hexane or toluene.



Using classroom products that are free of airborne irritants means healthy indoor air quality!

- > Eliminate unnecessary chemicals.
- > Reduce asthma and headaches.
- > Increase attendance and performance!

Learn more at [www.doh.wa.gov/schoolenvironment](http://www.doh.wa.gov/schoolenvironment)



DOH 333-243 August 2019

For people with disabilities, this document is available on request in other formats.

Call 1-800-525-0127 (TDD/TTY call 711).



# Essential Oils

## Guidance for Healthy Classrooms



### Are Essential Oils Beneficial?

Many people use essential oils as aromatherapy with the intent to treat various health conditions like pain, anxiety, asthma, and ADHD. However, systematic reviews of essential oils research have not found enough evidence to suggest they successfully treat any health issue (8).

### Are Essential Oils Safe to Use?

Essential oils can adversely affect the health and safety of students and staff in the classroom and can be dangerous. They contain compounds that can aggravate asthma in students; and they emit hazardous volatile organic compounds such as acetaldehyde, limonene, toluene, pinene, and camphene, all of which worsen asthma (9; 10; 1; 6; 3). They also can cause respiratory irritation, headaches and throat, eye, and nose irritation. Inhaling certain essential oils can cause pneumonia (6; 3).

Keeping essential oils in the classroom can be dangerous. When swallowed, eucalyptus, sage, and camphor oil can cause seizures, and lavender oil can cause a coma (12). Additionally, lavender oil and tea tree oil were shown to cause abnormal or premature breast development in girls and boys when applied to the skin or inhaled (5; 11).



### Recommendations

Avoid using all essential oils and other fragranced products in the classroom. Use fresh air and good ventilation to reduce exposure to respiratory pathogens, chemicals, and odors. Increased fresh air supply and air filtration have been shown to improve health and test scores. Open windows for additional air or use fans pointed out of windows and doors to improve ventilation, being careful not to circulate across students.

Some schools, school districts, or early learning programs have established policies or procedures that may prohibit essential oils. Schools and districts should adopt a policy or procedure prohibiting staff from bringing in and using any chemicals that are not pre-approved or provided by the district. Always consult with your school, program, or school district to ensure compliance with their policies/procedures.

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### How to Avoid Allergies

Essential oils can cause allergic reactions when applied to the skin. This table (adapted from (2)) contains examples of essential oils that have caused allergic contact dermatitis (allergy). All essential oils should be avoided for a healthy classroom environment.

Angelica	Cassia	Elemi	Juniper berry	Neem	Rosemary	Tangerine
Aniseed	Cedarwood	Eucalyptus	Laurel leaf	Neroli	Rose	Tea tree
Bay	Chamomile	Frankincense	Lavandin	Niaouli	Rosewood	Thuja
Bergamot	Cinnamon	Galbanum resin	Lavender	Nutmeg	Sage	Thyme
Black cumin	Citronella	Geranium	Lemongrass	Orange	Sandalwood	Turpentine
Black pepper	Clary sage	Ginger	Lemon	Palmarosa	Silver fir	Valerian
Cajeput	Clove	Grapefruit	Litsea cubeba	Patchouli	Spearmint	Vetiver
Calamus	Coriander fruit	Guaiacwood	Lovage	Peppermint	Spike lavender	Ylang ylang
Cananga	Costus root	Hinoki	Mandarin	Petitgrain bigarade	Star anise	Zdravetz
Cardamom	Cypress	Hyssop	Melissa	Pine needle	Sweet basil	
Carrot seed	Dwarf pine	Jasmine absolute	Myrrh	Ravensara	Sweet marjoram	

DOH 333-307 October 2022

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# Resources - Safer Disinfectants



## Safer Cleaning, Sanitizing and Disinfecting Strategies to Prevent Infection Transmission

Proper cleaning and disinfecting are important for reducing the spread of infectious disease. This fact sheet provides best practices for cleaning, sanitizing and disinfecting surfaces to prevent the spread of disease while minimizing harmful chemical exposures. These practices focus on the workplace, however they can be applied in any setting. Consult the U.S. Centers for Disease Control and Prevention and the U.S. National Institute for Occupational Health and Safety for the most current information.

► **Remember:** When possible for handwashing and cleaning surfaces, using soap and water is always the best option.

### Why are we talking about safer practices?



Hazardous chemicals are common in cleaning, sanitizing, and disinfecting products.

People using these products, and people in the spaces where they are used, can get sick or develop illnesses, including asthma. Others harm reproductive health or may cause cancer if too much exposure occurs. Some damage skin or other body systems. For example, custodians using cleaning products and disinfectants may suffer from work-related asthma due to exposure on the job.



Safer options are available.

Look for Safer Choice, Green Seal®, Ecologo® and Design for the Environment (DfE) labels on products.



These labels are on environmentally preferable cleaning products and disinfectants that have a lesser or reduced effect on human health and the environment. These labels have strict requirements and can help you avoid chemicals that have negative impacts.

### Key Terms

#### Cleaner

Removes germs, dirt, and impurities from surfaces or objects. Works by using soap/detergent, water and friction to physically remove dirt and germs from surfaces. Cleaning before disinfecting reduces spreading infection more than disinfecting alone.

#### Sanitizer

Reduces germs on surfaces to levels considered safe for public health (usually 99.99%). Products must be EPA registered.

#### Disinfectant

Destroys almost all infectious germs, when used as the label directs on a surface. No effect on dirt, soil, or dust. Should be used where required by law, in high-risk and high-touch areas, or in case of infectious disease. Products must be EPA registered.

Photo: iStockphoto.com/Tommaso

## HANDLING BODY FLUIDS IN SCHOOLS

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- A.** Standard Precautions
- B.** General Precautions
- C.** Hand Hygiene Procedures
- D.** Use of Gloves
- E.** Contaminated Needles, Broken Glass, or Other Sharp Items
- F.** Cardiopulmonary Resuscitation (CPR)
- G.** General Housekeeping Practices
- H.** Cleaning, Disinfecting, and Sanitizing
- I.** Disinfectants
- J.** Procedures for Cleaning and Disinfection of Hard Surfaces
- K.** Body Fluid Spills
- L.** Athletics
- M.** Procedures for Cleaning and Disinfection of Carpets/Rugs after contamination with body fluids
- N.** Disposal of Body Fluid-Containing Materials
- O.** Procedures for Cleaning and Disinfection of Cleaning Equipment
- P.** Procedures for Cleaning and Disinfection of Clothing and Linens soiled with Body Fluids
- Q.** Signs and Labels
- R.** Cleaning and Disinfecting Musical Mouth Instruments



# California DPH Occupational Health Watch January 2021

- Fragrance ingredients such as those found in perfumes, essential oils, air fresheners, and cleaning products can cause and trigger asthma. Fragrance products are used in many California workplaces and have been associated with over 350 cases of work-related asthma investigated by the Occupational Health Branch.
- To help California workers and employers address fragrances and work-related asthma, WRAPP created a [web page](#) dedicated to this issue. It features publications in multiple languages, a model fragrance-free workplace policy, and resources to find products that do not contain fragrances.

## *Resources*

- [Volatile chemical emissions from car air fresheners](#) (Journal article abstract)
- [Volatile chemical emissions from essential oils with therapeutic claims](#) (Journal article abstract)
- [Work-Related Asthma Fragrance Web Page](#)
- [Work-Related Asthma Prevention Program](#)

# Asthma-Safer Cleaning and Disinfecting Update - CaDPH

- [Work-Related Asthma, Cleaning Products, and Disinfectants](#) – OHB web page

[Reminders for Using Disinfectants at Schools and Child Cares \(PDF\)](#) | [Spanish](#) – California Department of Pesticide regulation InfoSheet

[Fragrances and Work-Related Asthma](#) – OHB web page

[Cleaning for Asthma-Safe Schools \(CLASS\)](#) – OHB web page

[Work-Related Asthma Prevention Program \(WRAPP\)](#) – OHB website



# Finding Products Without Fragrances

- [New York State's Green Cleaning Program](#) keeps a list of asthma-safer cleaning products without fragrance: (Under Product Category, choose "cleaning products." Click the "No" button next to the "Prefer products with fragrance" question)
- Some cleaning products have earned the [U.S. EPA's Safer Choice Fragrance-Free Label](#).
- The [Canadian Center for Occupational Health and Safety web page](#) includes steps for implementing a fragrance-free policy in the workplace.

# Research Study

Fragranced consumer products: exposures and effects from emissions, Anne Steinemann

Air Qual Atmos Health, 20 October 2016

- 35% of population reported health problems
  - Half disabled
- 15% have lost workdays or a job due to exposure in the workplace
- 20% would leave quickly if fragranced products
- 50%+ would prefer fragrance-free public places – hotels, airlines, healthcare, work
- 53% support fragrance-free workplace policies
  - 20% opposed
- 18% unable/reluctant to use public toilets due to scented sprays
- 14% unable/reluctant to wash hands with fragranced soap

An excellent presentation

[Navigating the Landscape of Air Cleaning Technologies for COVID-19 - YouTube](#)

(Slides 34, 49,50 from this presentation.)



**Indoor Environments**

**Please join us for EPA's next Indoor Air Quality Science Webinar**

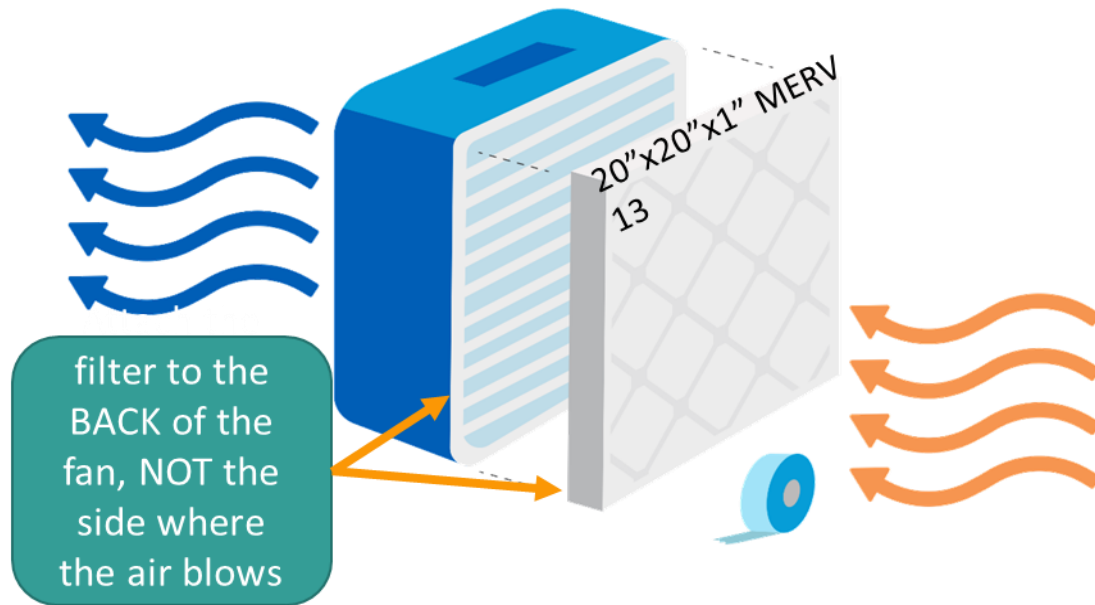
**Navigating the Landscape of Air Cleaning Technologies for COVID-19**

With guest speakers Brent Stephens, Ph.D., Illinois Institute of Technology and Elliott Gall, Ph.D., Portland State University

	<u>Date</u> Wednesday, June 16, 2021	<u>Time</u> 1:00 – 3:00 P.M. EDT	
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# Another Option: Create a Do-it-Yourself Box Fan Filter

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## Resources:

- [WA Department of Ecology's video on how to make your own clean air fan](#)
- [Puget Sound Clean Air Agency's info on DIY air filters](#)
- [Colville Tribes Air Quality Program box fan filter a DIY users guide](#)
- [Case-Study\\_DIY-Portable-Air-Cleaners-083121.pdf \(ucdavis.edu\)](#)
- [High Quality DIY Box Fan Air Purifier "Comparetto Cube" - YouTube](#)

Thank you for joining us in February for our webinar: [\*A National Conversation on Indoor Air & K-12 Schools During the COVID-19 Pandemic.\*](#)

Today, the Johns Hopkins Center for Health Security at the Bloomberg School of Public Health released a new report calling on kindergarten through 12th grade (K-12) school administrators to urgently invest in ways to provide healthy air in schools to increase safety during the COVID-19 pandemic and potential future respiratory disease outbreaks, as well as to improve student learning.



The new report, [\*School Ventilation: A Vital Tool to Reduce COVID-19 Spread\*](#), reviews how improvements in building ventilation can reduce the risks of disease transmission. The report also summarizes current ventilation guidelines for K-12 schools and shares the results of an analysis finding that ventilation improvements are a cost-effective public health measure compared to enhanced (“deep”) cleaning that focuses on surfaces.

[Tips to Improve Indoor Ventilation in K-12 Schools to Help Reduce COVID-19 Transmission](#)  
([centerforhealthsecurity.org](https://www.centerforhealthsecurity.org))

“School systems should use only proven technologies for improving indoor air quality: appropriate ventilation, HEPA filtration, or ultraviolet germicidal irradiation. They should not use chemical foggers or any “air cleaner” other than filtration and ultraviolet germicidal irradiation. School systems should not use unproven technologies such as ozone generators, ionization, plasma, and air disinfection with chemical foggers and sprays. The effect of these cleaning methods on children has not been tested and may be detrimental to their health. The primary aim for improving air quality should be to remove contaminants and impurities from the air and not to introduce new substances into the air.”

[20210526-school-ventilation.pdf](#)  
[\(centerforhealthsecurity.org\)](#)



# Schools For Health – How School Buildings Influence Student Health, Thinking and Performance



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## SCHOOLS



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# COVID-19 + SCHOOLS: WHAT TO KNOW



5-step guide to checking ventilation rates in classrooms

Joseph Allen, Jack Szemplak, Emily Ames, Jesse Costello-Laurent  
Harvard Healthy Buildings program | www.forschool.org



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# COVID-19 + SCHOOLS: RESEARCH AND NEWS



Washington Post: Schools finally have the road map they need to fully reopen

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Washington Post: Don't let covid-19 keep kids from playing sports

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Updates to the Risk Reduction Strategies For Reopening Schools Report

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## New Video Released

Watch our 8 Minute Video on the Importance of  
Filtration in Schools



[The Importance of Filtration In Schools - YouTube](#)

[Importance of Ventilation in Schools - YouTube](#)

Children spend a large portion of their day indoors at school. Ensuring adequate filtration and ventilation in classrooms is essential and will help support the health and productivity of students and teachers.



# Tool Lending Library

Smart Buildings Center, NW Energy Efficiency Council (NEEC)

<https://www.smartbuildingscenter.org/tool-library/>

Lending “library” of diagnostic tools.

CO, CO<sub>2</sub>, data loggers, power meters, lighting loggers, infrared cameras, liquid and air flow measurement devices, etc.

Free of charge. Shipping or pick up Tues-Thurs 9-4.

Guidance on how to use/interpret data.

Library of videos and application notes.

[Tool-library@smartbuildingscenter.org](mailto:Tool-library@smartbuildingscenter.org)

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You can subscribe for updates.





# Thank You

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Resources available:

[www.doh.wa.gov/schoolenvironment](http://www.doh.wa.gov/schoolenvironment)

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