VENTILATION, FILTRATION AND INDOOR AIR QUALITY FOR SCHOOLS

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DOH School Environmental Health and Safety Fall Webinar

November 9, 2021

Washington State Department of Health
School Environmental Health & Safety Program

Our Mission

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



DOH K-12 Guidance

Guidance	Guidance Themes and Updates
K-12 Requirements	• Update in progress: Technical updates, additional information on recent mask and vaccine requirements
K-12 Supplemental Recommendations	• Testing guidance (Test to Stay protocol) • Case investigation/contact tracing toolkit • Additional in-school mitigation strategies
Child Care, Youth Development, Day Camps	• Update: Alignment with K-12 Supplemental Recommendations
Preventing Transmission of SARS-CoV-2 During Aerosol Generating and Other Procedures	• Update: Health care recommendations for AGPs including procedures conducted in school nurse offices

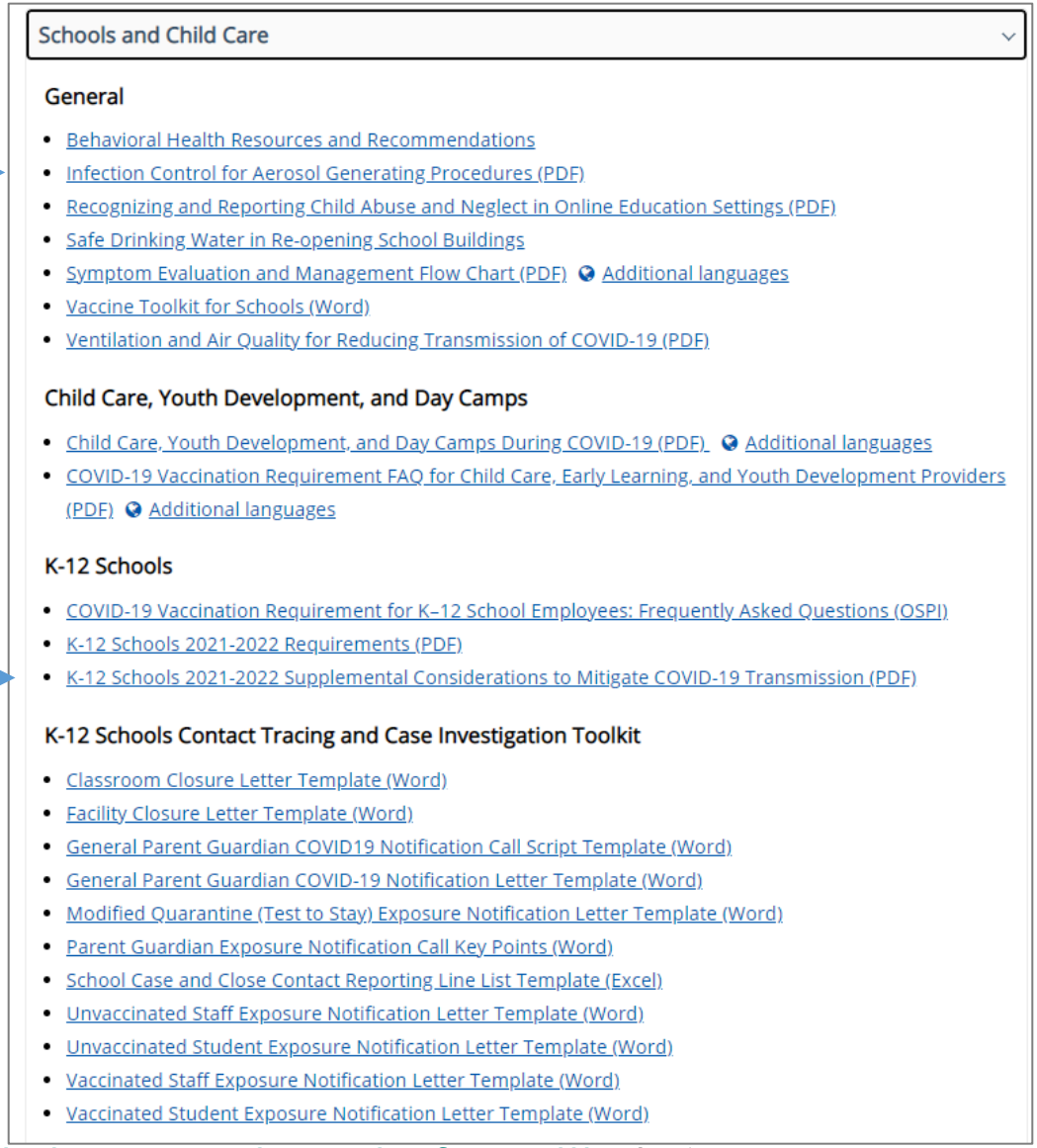
Guidance Location

Guidance can be found on the DOH COVID-19 Resources and Recommendations page

Updated Preventing Transmission of SARS-CoV-2 During Aerosol Generating and Other Procedures

New K-12 Supplemental Recommendations

New Case Investigation/ Contact Tracing Toolkit



Always check for the latest!

Washington State Department of Health
August 11, 2021
DOH 820-105

K-12 COVID-19 Requirements for Summer 2021 and the 2021-2022 School Year

Summary of August 10, 2021 Changes

- Requirements for K-12 extracurricular sports has been added.
- Requirements for K-12 co-curricular and extracurricular performing arts activities has been added.
- Updated recommendations for fully vaccinated individuals identified as close contacts of a person with confirmed COVID-19 in alignment with updated CDC guidance.

Summary of July 28, 2021 Changes

- Updates in this version reflect recently released CDC recommendations and seek to achieve two primary goals:
  - Minimize transmission of COVID-19 among students and staff in K-12 schools and to their families and broader community.
  - Maximize in-person instruction.
- Vaccination and face coverings/masks are the most effective tools to prevent transmission of COVID-19.
- All staff and students must continue to wear face coverings/masks, regardless of vaccination status.
- Physical distancing requirements have been updated to support provision of full time in-person instruction.
- Information on how schools should "layer" mitigation strategies for the best outcome is provided.
- Quarantine protocols have been updated to reduce student exclusions from instruction.
- Expanded information on diagnostic and screening testing is provided.
- Updated links to relevant L&I orders are provided.
- General alignment updates to COVID-19 language are made.
- Extra- and Co-Curricular requirements will be published in early August.

Always check for the latest!

Washington State Department of Health

September 13, 2021
DOH 820-218

Supplemental Considerations to Mitigate COVID-19 Transmission in K-12 Schools

Introduction

This guidance provides additional information on optional strategies schools may take to further reduce transmission risks to student and staff from COVID-19. These are not requirements. See the DOH K-12 School 2021-2022 Requirements document and Governor's K-12 Schools Proclamation for information on requirements for K-12 schools for the 2021-2022 school year.

These optional strategies are intended for public and/or private schools serving kindergarten through 12th grade (K-12). They are based on existing science, expert public health opinion, and stakeholder feedback. This guidance uses information from the Centers for Disease Control and Prevention's Guidance for COVID-19 Prevention in K-12 Schools.

DOH encourages schools to coordinate with their local school board and the local health department for any decisions related to the optional strategies outlined herein.

Successfully using these recommendations relies on communication between schools and local public health authorities. Some of this communication may include private information that falls under the Family Educational Rights and Privacy Act. FERPA allows schools to share personally identifiable information with local public health without consent when responding to a health emergency. Read more about FERPA.

The purpose of this document is to provide school districts ideas for implementation at the start of the school year. These recommendations are intended to be supplemental to the K-12 School 2021-22 Requirements.

Prevention – Everyone's Job!

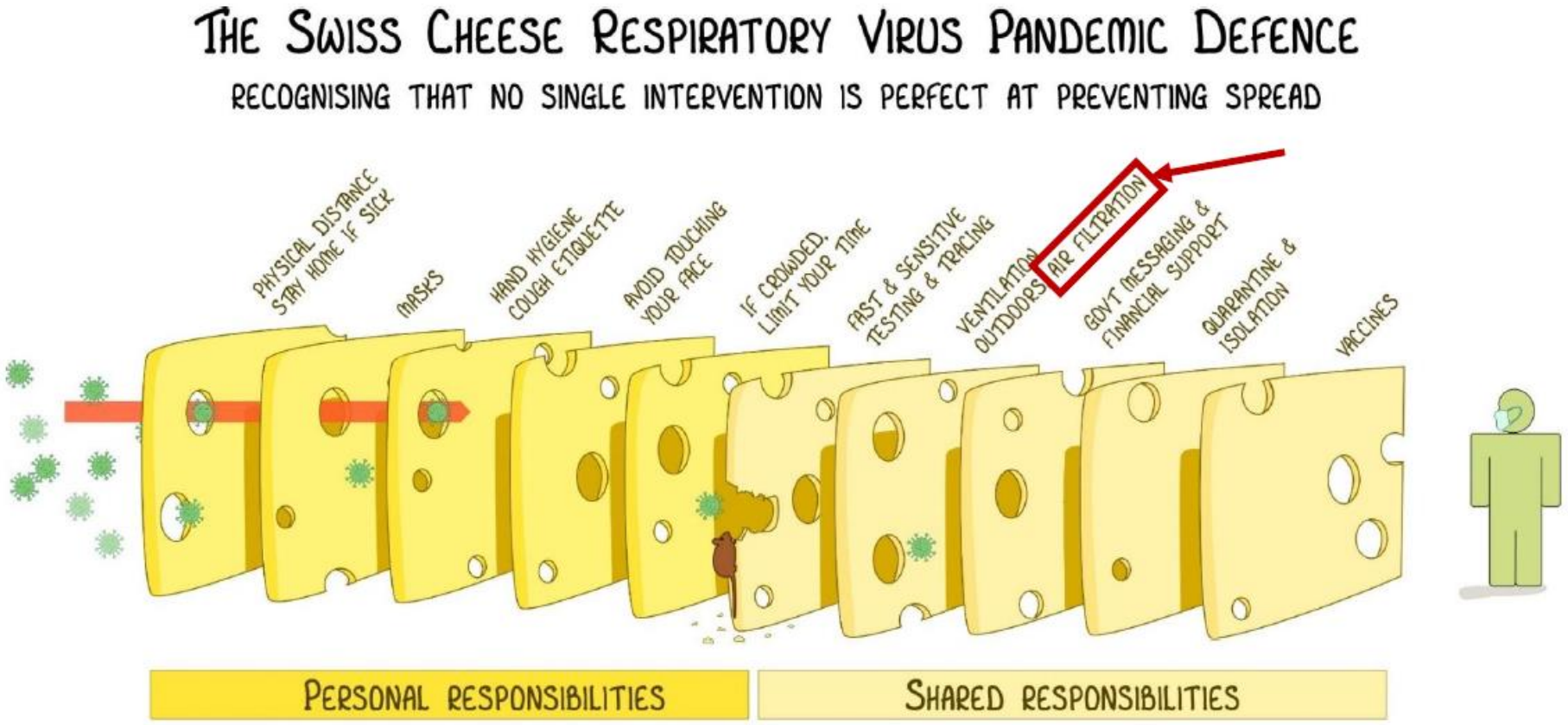
- Wash your hands with plain soap and water – often!
- Cover your cough or sneeze.
- Avoid touching your eyes, nose, or mouth.
- Stay out of spit zones.
- Get vaccinations.
- Good ventilation.
- Stay home when ill.
- Support Public Health.

I have used this slide for many years in presentations. It's the basics!

Basics for COVID Prevention

- Get vaccinated!!!!
- Stay home when sick
- *Self-isolate for 14 days if you've been around someone with COVID-19 for more than 15 minutes, closer than 6' (modified for schools & vaccination status).*
- *Wash hands frequently with plain soap and water (especially before touching face)*
- ***Wear a cloth face covering***
- ***Keep 6 feet between people***
- *Maximize outside air, reduce air recirculation, increase filtration to a MERV 13, reduce occupancy*
- *Stay outside as much as possible*
- *Clean frequently touched surfaces*

Need for Layered Risk Reduction



www.nytimes.com/2020/12/05/health/coronavirus-swiss-cheese-infection-mackay.html

COVID-19: Without masks, two meters distancing is not enough, research finds
Simulations track the spread of coughs and safe physical distancing indoors

- In a study published in *Building and Environment*, the researchers found that when people are unmasked, more than 70 percent of airborne particles pass the two meters threshold within the 30 seconds. By contrast, less than 1 percent of particles cross the two-meter mark if masks are worn.
- However, wearing a mask indoors can reduce the contamination range of airborne particles by about 67 percent.

McGill University. "COVID-19: Without masks, two meters distancing is not enough, research finds: Simulations track the spread of coughs and safe physical distancing indoors." ScienceDaily. ScienceDaily, 5 October 2021. <www.sciencedaily.com/releases/2021/10/211005124725.htm>.

Personal Protective Equipment: Surgical and 3-layer Masks

Mask Selection

- Use a surgical mask or 3-layer tightly woven mask
- Can be modified for better protection
- Surgical masks should be replaced at least once a day
- Other masks should be brought in clean each day, and can be washed in regular laundry

Personal Protective Equipment: Masks

Proper Mask Usage- Surgical Masks and Other 3-layer Masks

Mask Placement:

1. Wash your hands
2. Place loops over ears
3. Pinch nose strip to secure

Mask Removal:

1. Remove by ear loops (don't touch face)
2. Place in garbage or secured location for re-use
3. Wash your hands

Healthy Personal Habits

- Avoid touching your face, nose, eyes, and mouth

A study conducted at the University of New South Wales showed that a group of medical students touched their faces an average of 23 times per hour.

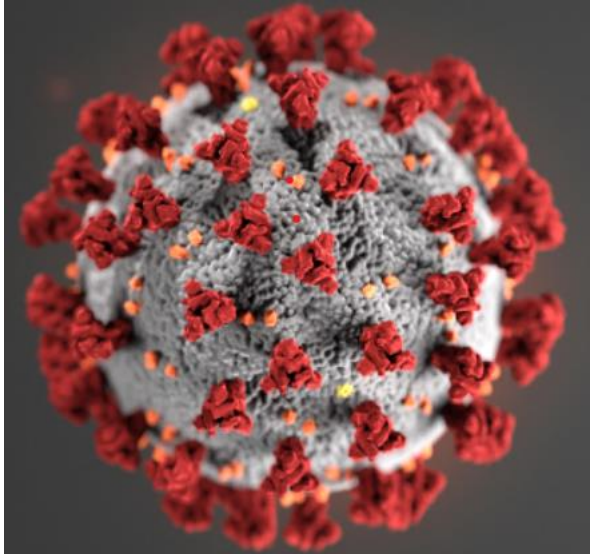
Ref: Am J Infect Control . 2015 Feb;43(2):112-4. doi: 10.1016/j.ajic.2014.10.015.

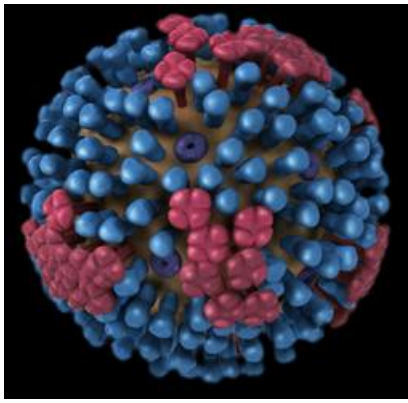
- When wearing PPE, avoid touching the front of your mask

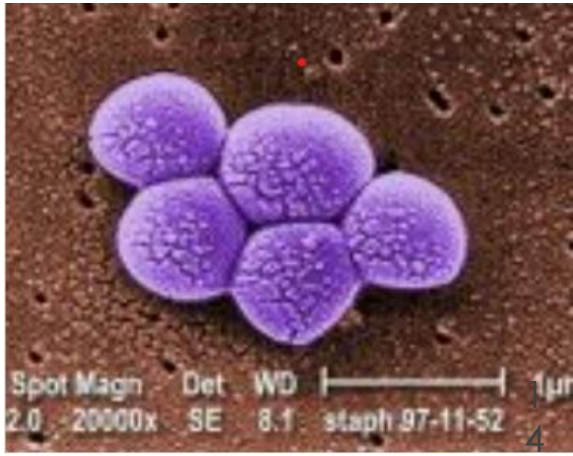
Pathogens in Schools

(Short List)

- Respiratory
  - Influenza
  - Measles
  - *Pertussis* (Whooping Cough)
  - COVID-19
- Athletics – skin pathogens
  - MRSA
    Methicillin Resistant Staphylococcus aureus
- Fecal/Vomit-Oral
  - Norovirus
  - *Clostridium difficile* (C. diff)
  - *Salmonella*







Indoor Air Quality

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

Indoor Air Quality Principles

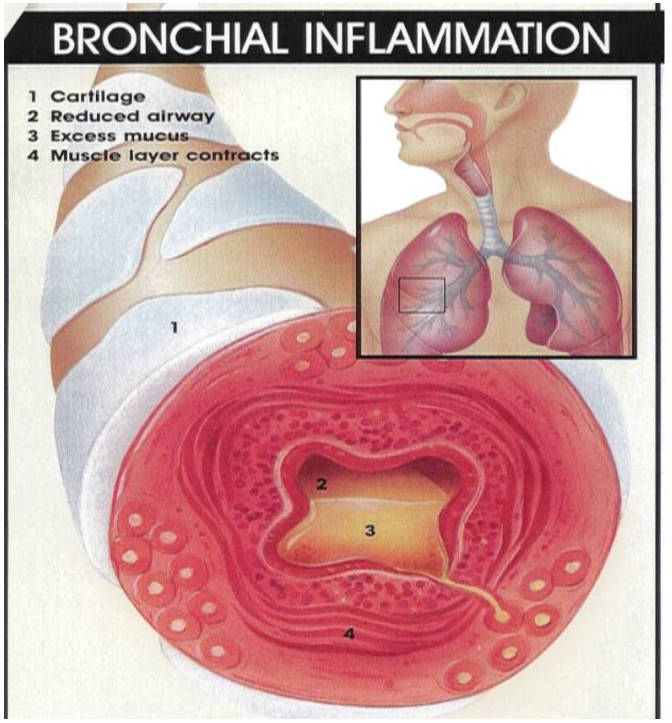
- Source control
- Ventilation
- Filtration

"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

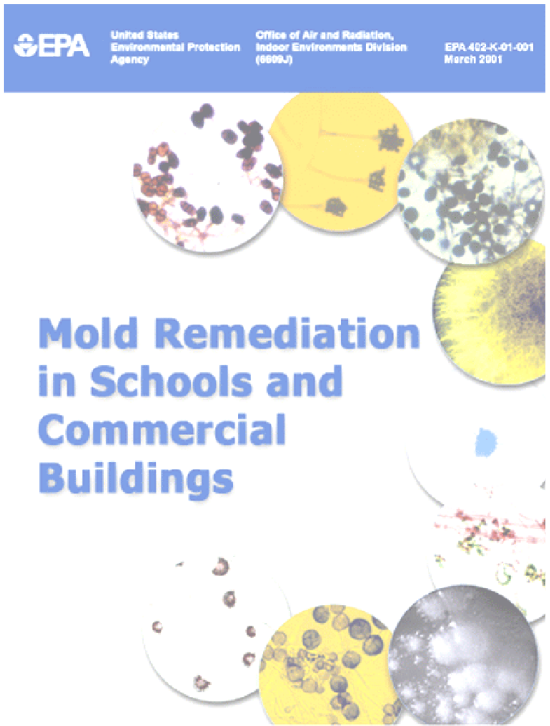
Control Asthma Triggers

- 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

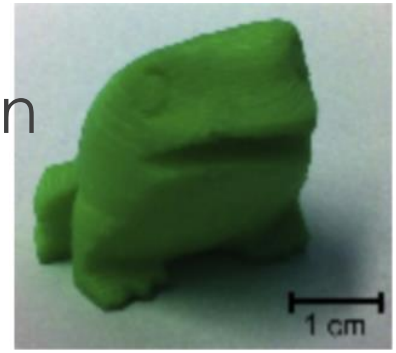


Mold

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



3D Printers



- Heated thermoplastic extrusion/deposition
- Significant aerosol emission potential
  - "High emitters" of ultrafine particles
  - Gases/fumes
- Provide exhaust ventilation

- "caution should be used when operating many printer and filament combinations in enclosed or poorly ventilated spaces or without the aid of gas and particle filtration systems" Azimi, P et. al. Emissions of Ultrafine Particles and Volatile Organic Compounds from Commercially Available Desktop Three-Dimensional Printers with Multiple Filaments, *Environmental Science and Technology*, 2016, 50(3), 1260-1268

  (https://pubs.acs.org/doi/full/10.1021/acs.est.5b04983)

Makerspaces

What requires local exhaust ventilation?

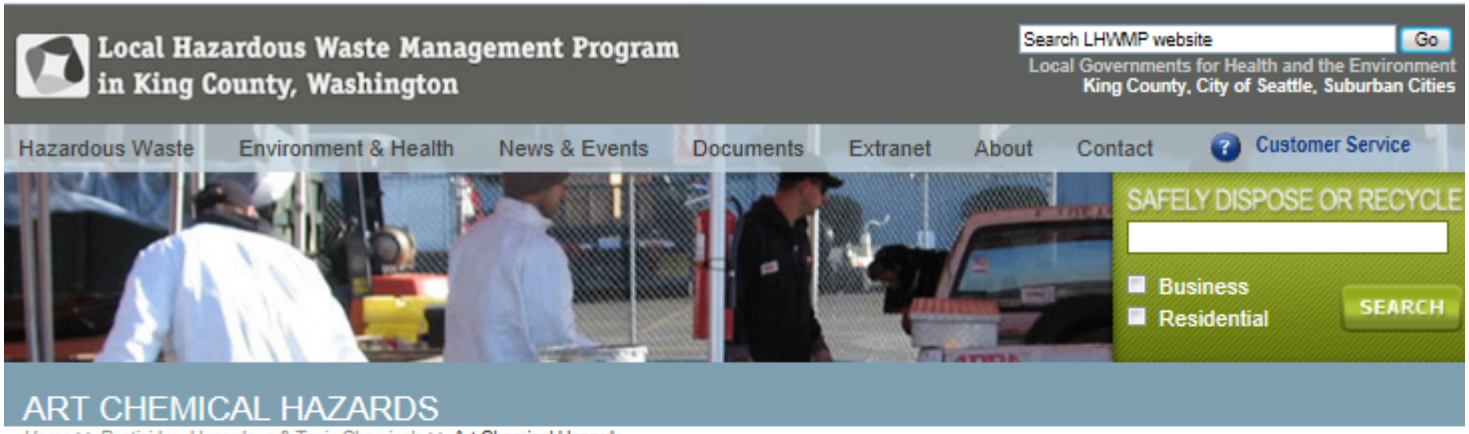
What other safety requirements?

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.

Art Hazards in Schools



Chemicals

- Art Chemical Hazards
- Hazardous Chemicals in Schools
- Chemicals Policy
- School Chemical List
- Mercury
- Bisphenol-A
- Solvents

Art Hazards Project

Print This Page

Many art techniques involve the use of chemicals that can pose risks to human health and the environment if mishandled. The objective of the Art Hazards Project, a project of the Local Hazardous Waste Management Program in King County, is to protect artists' health and the natural environment in King County from the risks posed by hazardous chemicals in art supplies.

The Art Hazards Project helps identify potentially hazardous chemicals in art supplies and provides information on ways to reduce risks from these chemicals to artists, museum and gallery staff, art educators, and art suppliers through seminars and trainings.

The project team collaborates with artists, art colleges, cooperatives, museums, galleries and suppliers to help artists and art educators understand risks, reduce potential exposures to chemical hazards, and ensure hazardous art materials are properly recycled or disposed when no longer needed.

For more information on the Art Hazards Project or to schedule a training, seminar or initial meeting, contact Dave Waddell at 206-263-3069 or dave.waddell@kingcounty.gov.

Art Supplies – Risks and Alternatives

Selecting Safer Art Adhesives (PDF, 881 KB)

Related Materials

Guidelines for the Safe Use of Art and Craft Materials
http://www.oehha.org/education/art/artguide.html

INFORM - Strategies for a better environment (PDF)

cides/artchemicals.aspx

Lead Soldering – Exhaust Ventilation Required

The "Fragrance Problem"

- **Pervasiveness**
  Fragranced consumer products suffuse society
  Over 98% of Americans use fragranced products at least weekly

- **Pollutants**
  Fragranced products are a primary source of indoor air pollutants as well as outdoor air pollutants (e.g., contributors to urban smog)

- **Emissions**
  Fragranced products (even ones called green**, organic, and natural) can emit and generate hazardous air pollutants**

- **Regulation**
  Fragranced product emissions are generally unregulated;
  product ingredients are largely unkno**wn**

Perfumed, Fragranced, & Scented Not in Schools!

- **Added fragrances can trigger asthma attacks, allergies, sensitization.**
  - People on the autism spectrum 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 IA and OA pollutants.**
- **Look for "fragrance-free," not "unscented".**
- **New 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

- **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**

American Lung Association **Sample Fragrance-Free School Policy**
http://www.healthyschools.org/documents/fragrance-free-policy-sample-updated.pdf

No Spraying/Fogging Chemicals Into the Air

EPA does not recommend use of fumigation or wide-area spraying to control COVID-19. The Centers for Disease Control and Prevention (CDC) recommends that you clean contaminated surfaces with liquid products, such as those provided on List N, to prevent the spread of disease. Read CDC's recommendations. Fumigation and wide-area spraying are not appropriate tools for cleaning contaminated surfaces.

In indoor spaces, routine application of disinfectants to environmental surfaces by spraying or fogging (also known as fumigation or misting) is not recommended for COVID-19.

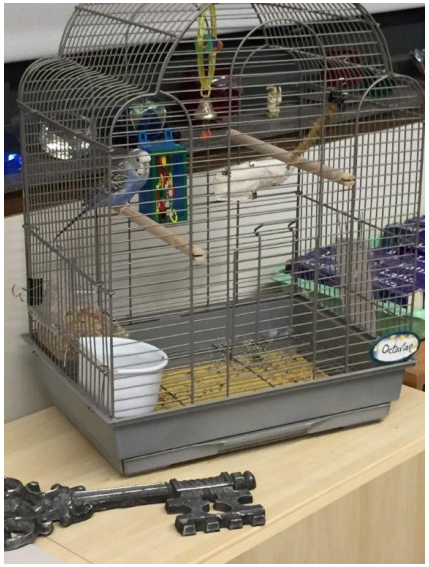
Spraying individuals with disinfectants (such as in a tunnel, cabinet, or chamber) **is not recommended under any circumstances**. This could be physically and psychologically harmful and would not reduce an infected person's ability to spread the virus through droplets or contact. Moreover, spraying individuals with chlorine and other toxic chemicals could result in eye and skin irritation, bronchospasm due to inhalation, and gastrointestinal effects such as nausea and vomiting. WHO

Say NO….

- Cake toilet deodorizers
  - paradicholorobenzene
- Citrus & Terpene Solvents
  - D-Limonene
- Nano Technology
  - nano-silver
- "Air Fresheners"
- Ozone generators
- Fragrances
- Anti-microbial soaps
  - Triclosan / Triclocarban
  - Quaternary Ammonia compounds

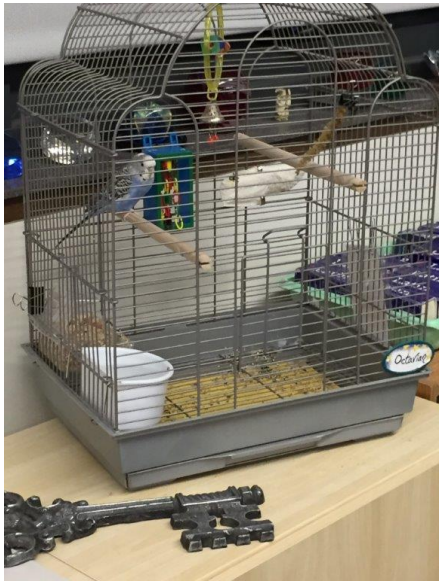
Zoonotic Diseases
Animal Concerns

- *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

Bed Bugs

- Work with a pest control company committed to using IPM
- Cleaning/sanitation/clutter control
- Resources

  Very comprehensive power point:

  - Bed Bugs in Schools - US EPA https://www.epa.gov/sites/production/files/documents/BB_in_Schools
  - Bed Bug Action Plan for Schools www.vdacs.virginia.gov/pdf/bb-schools1.pdf
  - Bed Bugs – Pest Press https://s3.wp.wsu.edu/uploads/sites/415/2014/12/PNW_PPBedBugs-Fall.pdf

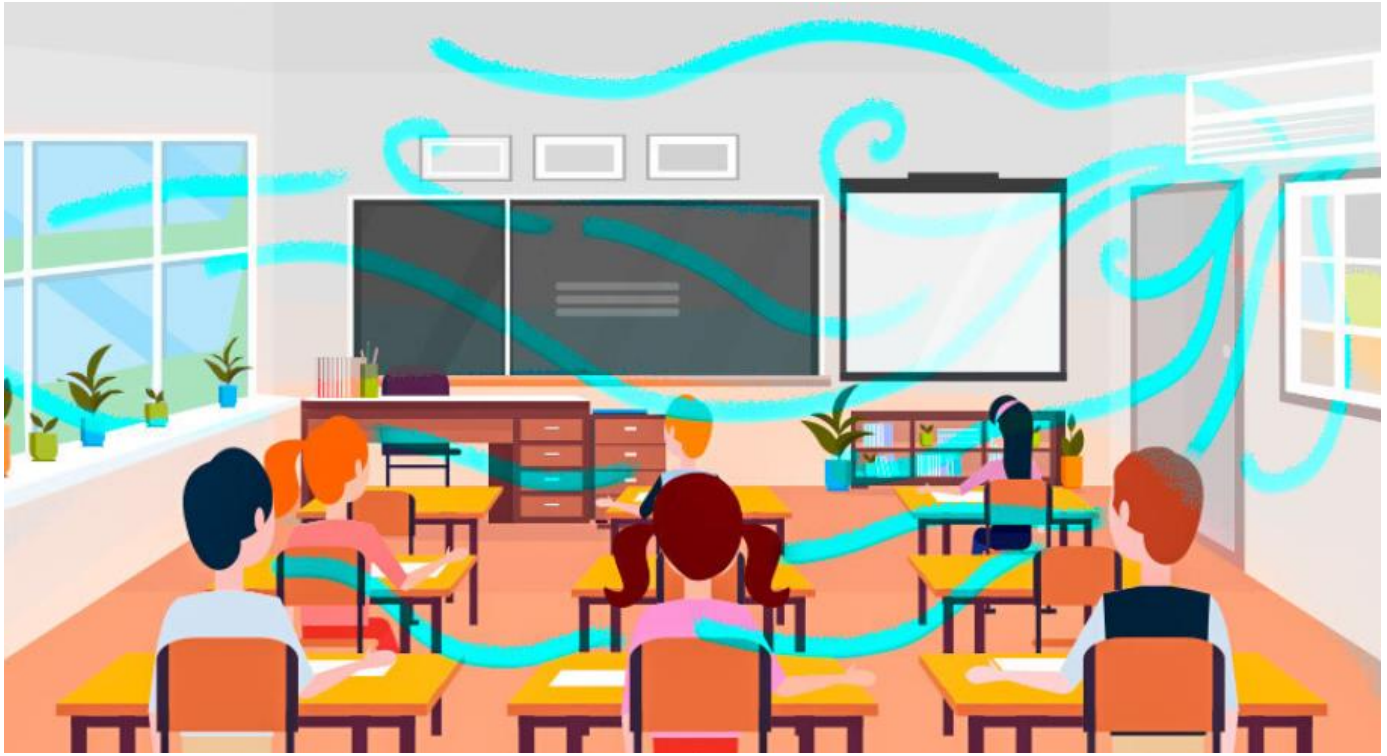
Head Lice

- Parasitic insect adapted to living mainly on the scalp and neck hairs
- Not a health hazard or responsible for the spread of any disease
- Not a sign of uncleanliness
- Transmitted by direct contact with live louse through head-to-head contact or through contact with personal articles such as hats or combs

Head Lice Misapplication

- School District applied a lice insecticide without pre-notification or posting.
- Made the application during recess to the collars and hoods of about 20 coats.
- Residues detected on the coats ranged from 5 to 16 µg/sample.
- Two children had headaches and were nauseated, and one child had two very serious asthma attacks that evening.

Ventilation



Ventilation in the Codes
These are Minimums!

- International Mechanical Code (WAC 51-52)
- IMC ventilation requirements are based on ASHRAE 62.1
- **Codes are minimum.**
- Classrooms/computer labs: **10 cfm/person + 0.12 x occupancy**
  - Default: 15 cfm/person
- Science, art, wood/metal shops: **10 cfm/person + 0.18 x occupancy**
  - Default: 17 cfm/person for science labs,
    19 cfm/person for art and wood/metal shops.
  - Air from these rooms may not be recirculated to other parts of the building.

WAC 246-366-080 Ventilation.

(1) All rooms used by students or staff shall be kept reasonably free of all objectionable odor, excessive heat or condensation.

(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.

Ventilation and School Performance

Increases of ventilation rates up to approximately **15 cfm per student** are associated with a higher proportion of students passing standardized reading and math tests.

Increases in classroom ventilation rates up to approximately **20 cfm per student** are associated with improvements in student performance of a few to several percent, with the magnitude of improvement depending on the initial ventilation rate.

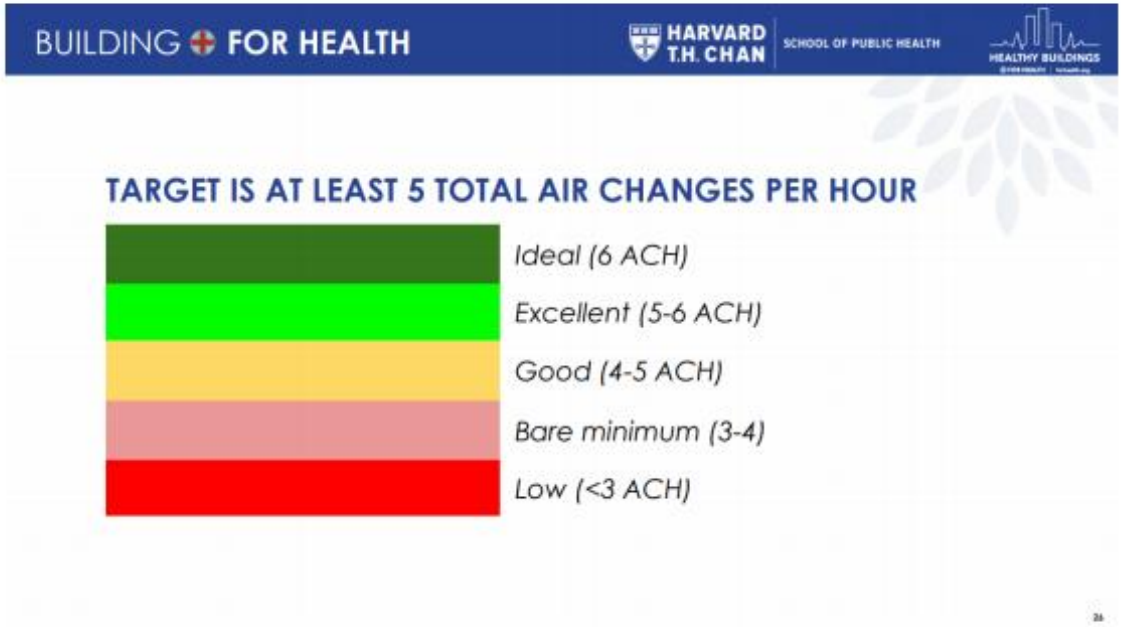
Lawrence Berkeley National Labs Indoor Air Quality Scientific Finding Resource Bank
https://www.iaqscience.lbl.gov/performance-summary

Ventilation – Requirements

K-12 Schools Requirements 2021-2022 (wa.gov)

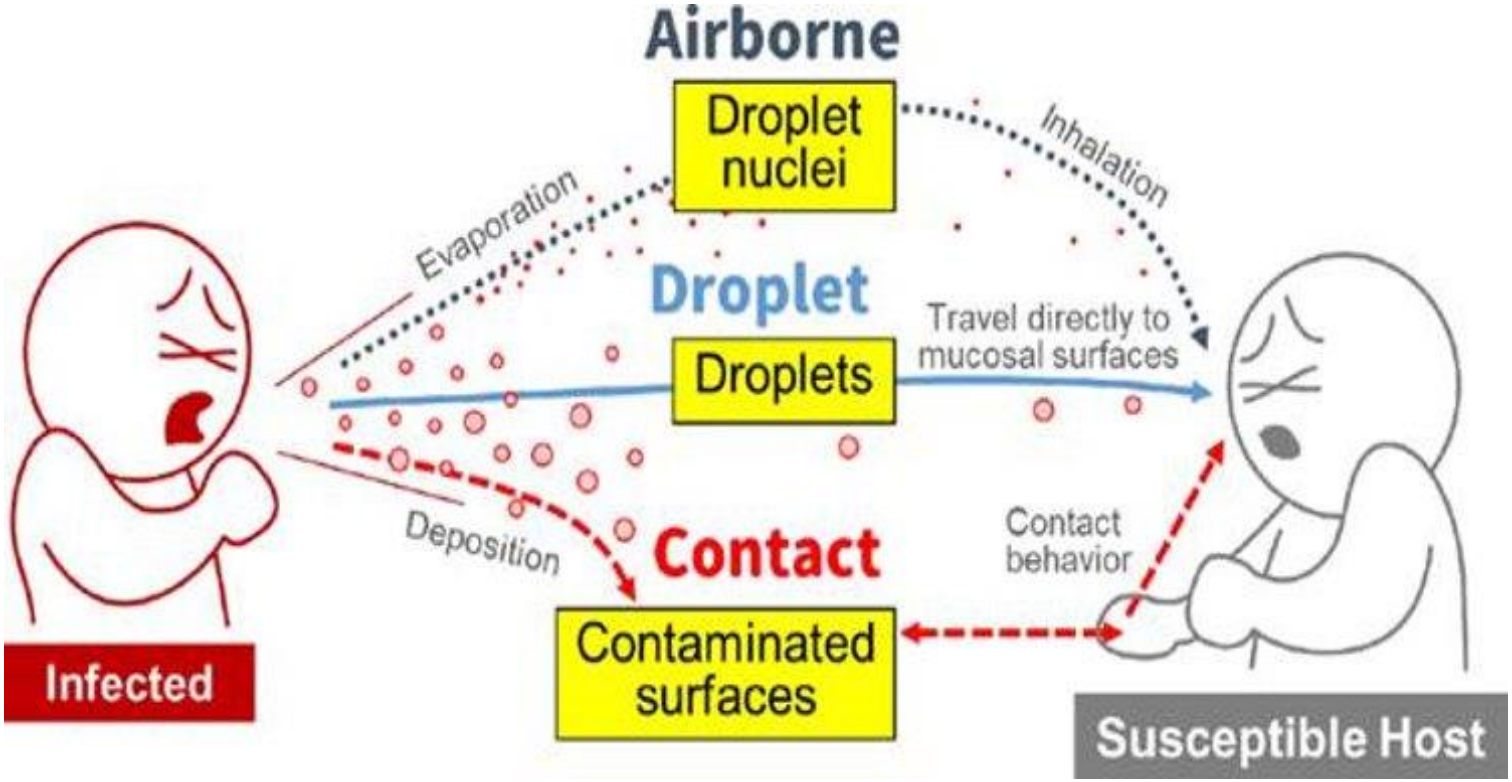
- Good ventilation and indoor air quality are important in reducing airborne exposure to respiratory pathogens, chemicals, and odors.
- Offer more outside time
- Open windows often
- Adjust the HVAC system to allow the maximum amount of outside air to enter the program space and increase air filtration.
- A professional engineer or HVAC specialist should be consulted to determine the best way to maximize the system's ventilation and air filtration capabilities for each area in the building.

Ventilation –Pandemic Guidelines



https://schools.forhealth.org/wp-content/uploads/sites/19/2020/08/Harvard-Healthy-Buildings-program-How-to-assess-classroom-ventilation-08-28-2020.pdf

Virus Transmission and Indoor Air



Modes of Transmission from Exhaled Pathogens (adapted from leaflet of the Office of the Prime Minister and the Ministry of Health, Labor and Welfare of Japan (2020))

Airborne Transmission

Where we can look to Ventilation for Help

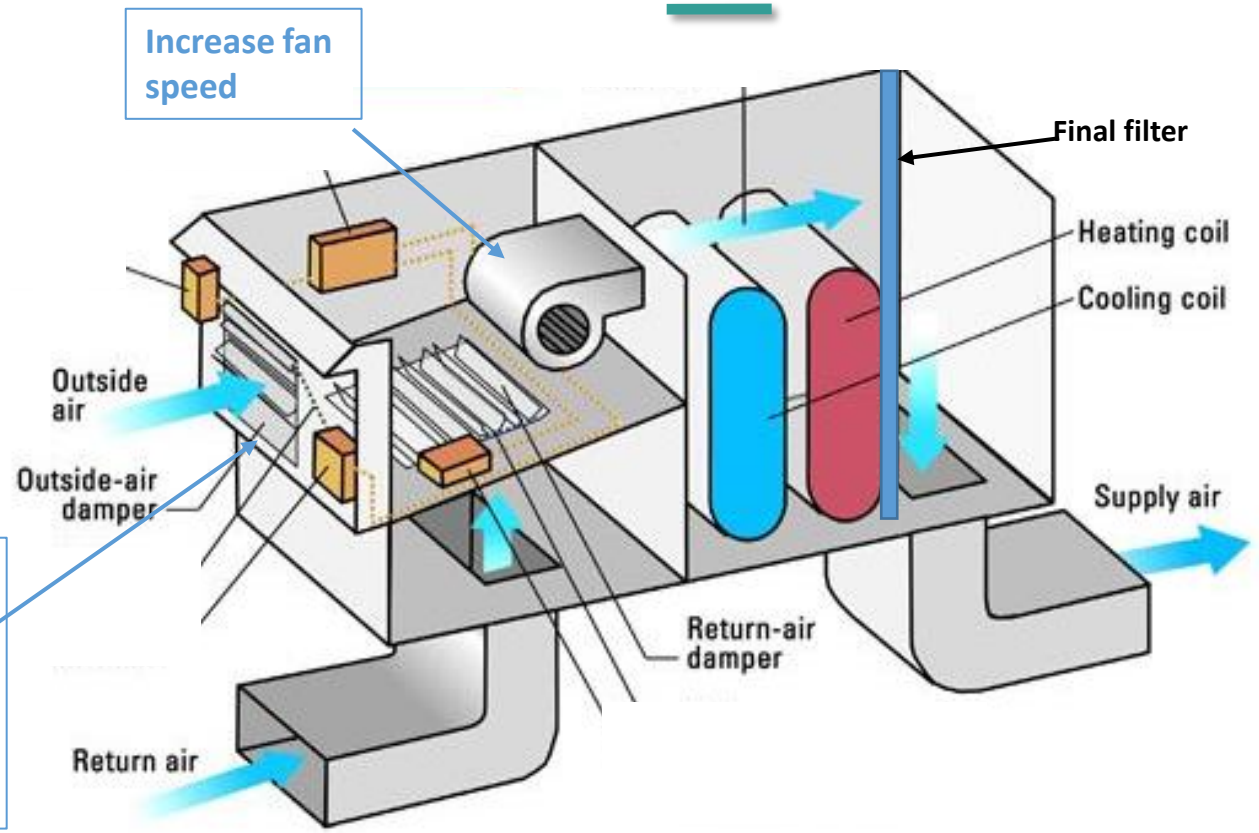
What ventilation can do:

*Help dilute particle concentrations

*Filter out particles

*Direct Air Movement
(negative/positive pressure, direct exhaust)

Improving Dilution at Air Handling Unit



Opening Windows to Improve Dilution

- Simply Open windows and doors to provide air movement

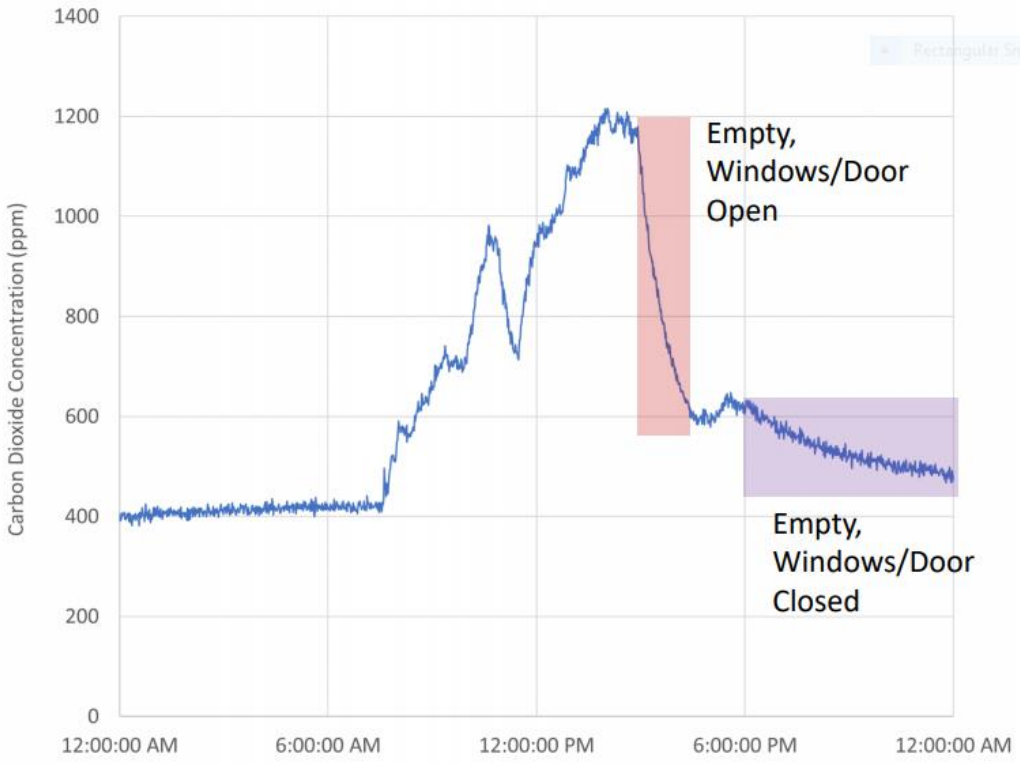
- Put a box fan in the window to push air out- this will draw air in from adjacent window

CO_2 as a Measure of Dilution

Important Considerations:

- Must be compared to outside concentration
- Measure near center of room
- No one should breathe on monitor
- Not directly near ventilation
- Should log for an entire day
- Concentration is a function of:
  - room size
  - ventilation rate
  - number of occupants
  - activity level

***Goal is to keep CO_2 below 700-800 if possible**



Example Classroom CO_2 Data

Source: Collaborative on Health and the Environment Webinar- https://www.healthandenvironment.org/webinars/96581

What if we find a poorly ventilated classroom?

Check Equipment:

- Do you have a faulty damper, fan, or sensor?

Check Room Use:

- Is the room being used as designed?
  (e.g., 35 students present when room was designed for 20)

Search:

- Are there any other sources of CO2 coming into the room?

Source: Collaborative on Health and the Environment Webinar-https://www.healthandenvironment.org/webinars**/96581**

Take Home on Improving Dilution

- Testing and balancing to verify you are getting the designed amount of dilution
- Setting up air distribution system to serve a fully occupied building will provide fewer people with more air volume (understand demand/control settings)
- Maximize outside air, reduce recirculated air
- Monitor CO_2 – keep below ~700 - 800 ppm if possible
- Open windows and doors when feasible

Filtering Indoor Air

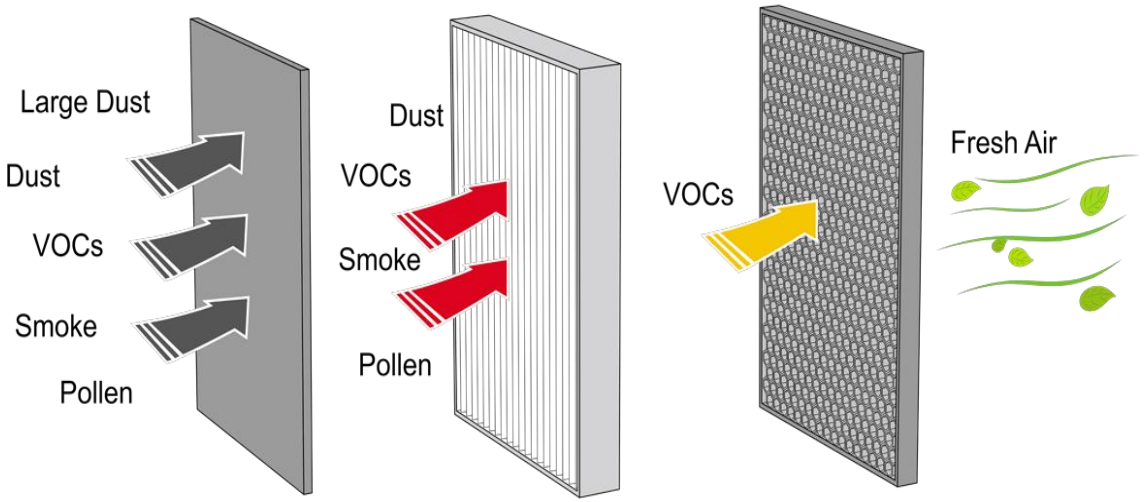
Examples of Particles we Want to Filter Out

- Environmental Particles
  - Pollen, Mold, Spores

  - Wildfire Smoke

- Respiratory Particles
  - Infectious aerosols

Different Filters for Different Contaminants



Pre-filter for large particulates

Smaller pore filter for smaller particulates

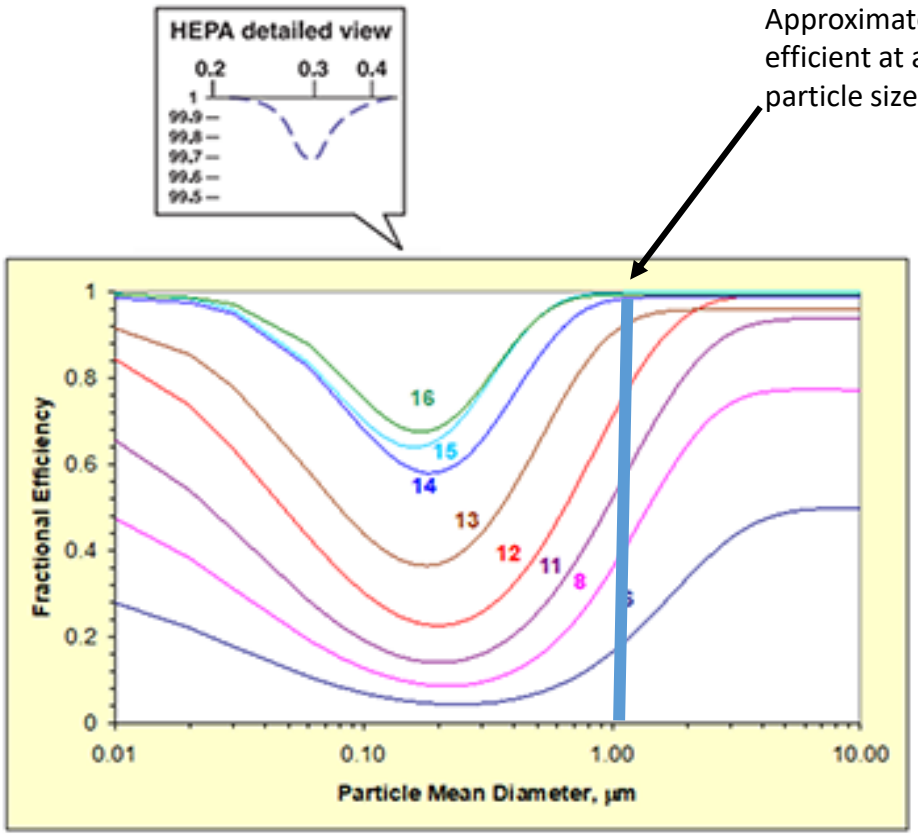
Activated charcoal filter for airborne chemicals

Particulate Filtration Recommendations

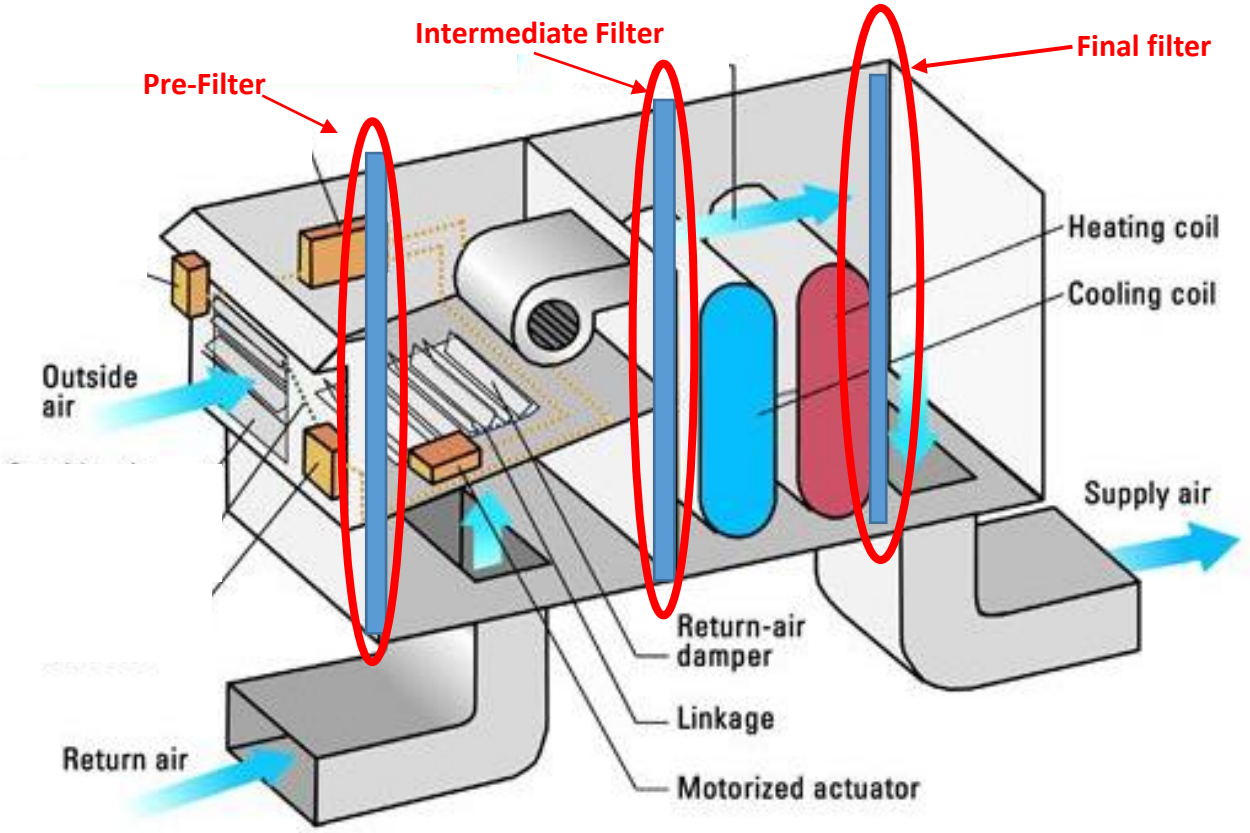
Filtering within Building Ventilation System

- Minimum of MERV 13 for Recirculated Air (COVID-19)
  - Placed in AHU after return air duct enters
- Minimum of MERV 13 for Outside Air (wildfire smoke)
  - Can be placed at any location in AHU, but typically after a coarser filter

Building Ventilation System: Why MERV 13 Filters?



Where Filters are Typically Located in Air Handling Unit



ASHRAE recommends minimum of MERV 13 for last filter

Improvement of Room Filtration

Do you see a use for a portable HEPA unit?

- Is there a common area, high use area with minimal airflow?

Portable HEPA units can provide localized room filtration

- They can be sized to a room
- Some available for $200

Selection and Use of Portable Air Cleaners

National Institute of Environmental Health Sciences
Worker Training Program

Selection and Use of Portable Air Cleaners to Protect Workers from Exposure to SARS-CoV-2

This fact sheet provides guidance to help employers, building operators, and union officials select and use portable air cleaners to remove virus-contaminated air in indoor spaces.

Overview

Ventilation and filtration are important to prevent transmission of COVID-19. SARS-CoV-2, the virus that causes COVID-19, is mainly spread through inhalation of virus-contaminated air when an infected person speaks, laughs, coughs, sings, or sneezes. Physical distancing alone will not prevent the build-up of viral particles in a room or workspace (Figure 1).

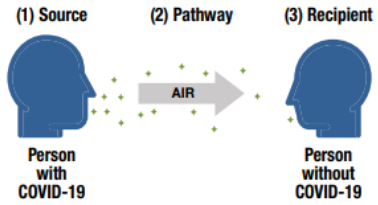


Figure 1. For transmission to occur via tiny airborne particles, three things are necessary: source, pathway, and recipient.[1]

Approximately 40% of people who are infectious are asymptomatic (no symptoms) or presymptomatic (before symptoms begin) and may contaminate air unknowingly. Work settings with inadequate ventilation and/or those that require people to be close together for extended periods of time, increase the risk of COVID-19 transmission. The illustration at right outlines the recommended steps to improve ventilation in buildings (Figure 2).

1 Based on an image from the Center for Infectious Disease Research and Policy. https://www.cidrap.umn.edu/covid-19/preparedness-and-response/protecting-essential-workers

The Centers for Disease Control and Prevention defines close contact as within 6 feet of a person for 15 minutes or more during a 24-hour period. Wearing a cloth or surgical mask, while helpful, cannot be relied upon to prevent the spread of COVID-19.

Figure 2. Illustration of the order in which to consider improvements to ventilation in buildings.[2]

2 Source, Jones et al, 2020. Schools for Health, Risk Reduction Strategies for Reopening Schools. Harvard Healthy Buildings Program.

Key point: If feasible, increase outside air and filtration in the building's mechanic ventilation system. If that is not feasible, **then** consider using portable air cleaning units.

Source: https://tools.niehs.nih.gov/wetp/public/hasl_get_blob.cfm?ID=13021

HEPA Filtration- Useful Terminology

- CADR (Clean Air Delivery Rate) -
- HEPA (High Efficiency Particulate Air) filter - must remove at least 99.97% (ASME, U.S. DOE) of particles whose diameter is equal to 0.3 µm.
- True HEPA vs other HEPA - "true HEPA" defines standard in the US, others may only achieve 99% efficiency down to 0.3 µm (still good though)
- ACH (Air Changes per Hour) – how many times the air in the room fully moves through the HEPA unit in an hour (aim for 5 or more).

Selecting a Portable HEPA Unit

- Make sure the unit has a 99%- 99.97% filtering efficiency for particles down to 0.3 um

- Choose a unit with a Clean Air Delivery Rate (CADR) appropriately sized to the room:
  - Multiply the length by the width of the room (in feet). This will give you the square feet area of the room. The CADR is based on this measurement.

Example Label

The clean air deliver rate (CADR) is 155 square feet. This means that the air cleaner is sized to clean a room that has a dimension of approximately 15 feet X 10 feet (assuming a ceiling height of 8 feet)

Unit will provide 5 air changes per hour based on the CADR rating.

Selecting a Portable HEPA Unit

EPA has also provided the following chart for CADR selection based on room size:

Portable Air Cleaner Sizing for Particle Removal						
Room Area (square feet)	100	200	300	400	500	600
Minimum CADR (cfm)	65	130	195	260	325	390

Notes:

- cfm = cubic feet per minute
- This chart is for estimation purposes. The CADRs are calculated based on an 8-foot ceiling. If you have higher ceilings, you may want to select a portable air cleaner with a higher CADR.
- CADRs and square footage values in table achieve approximately 4.9 air changes/hour

Source EPA Guide to Air Cleaners in the Home, 2nd Edition.

Other HEPA Unit Selection Considerations

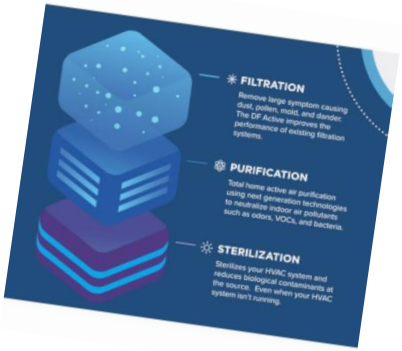
- Select a unit that has been certified by the California Air Resources Board (CARB) to have no ozone emissions
- Look for Association of Home Appliance Manufacturer (AHAM) Certification- this is a third-party certifying organization that verifies unit function
- Look for one that does NOT have additional features such as UV lights, ionizers, electrostatic precipitators, plasma, etc. (nothing additive).
- Look for a noise rating of 45 decibels or less with other equipment running.
- You may need more than one unit for your room

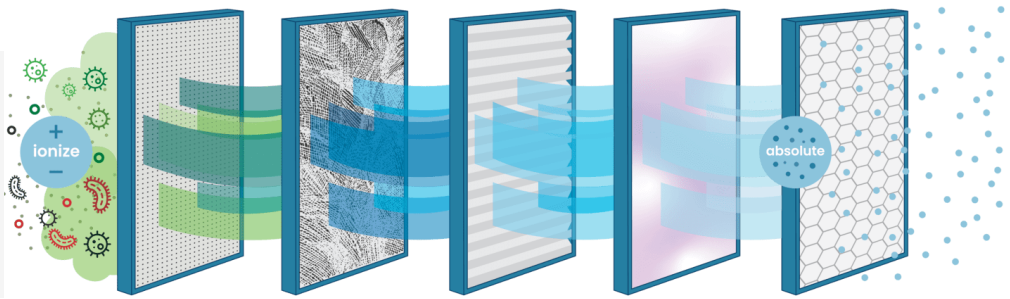
HEPA Unit Placement and Maintenance

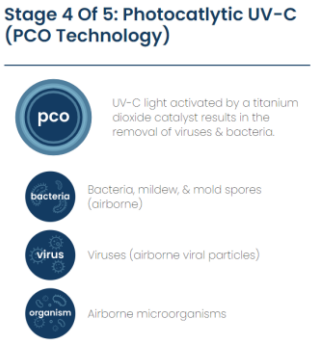
- Do not place next to corners, doorways, curtains, walls, or furniture
- Units should be about 3 feet away from obstructions
- Place away from open windows (units are meant to filter air from inside, not outside)
- Have a filter replacement schedule that is easy to follow and based on the manufacturer's recommendations
- Ensure good fit of filters in the frame during maintenance

Mixed Technologies Are Being Marketed

https://ultraviolet.com/ultraviolet-air-ozone-generator/

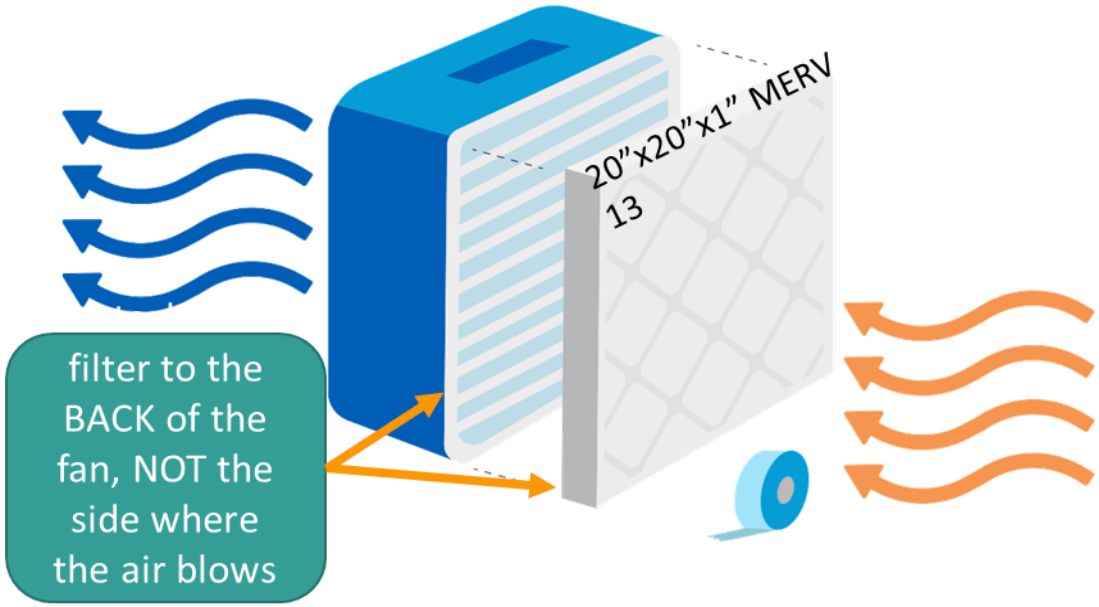






https://www.sanalifewellness.com/air-purifier-technologies/multi-stage-air-filtration

Another Option: Create a Do-it-Yourself Box Fan Filter



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

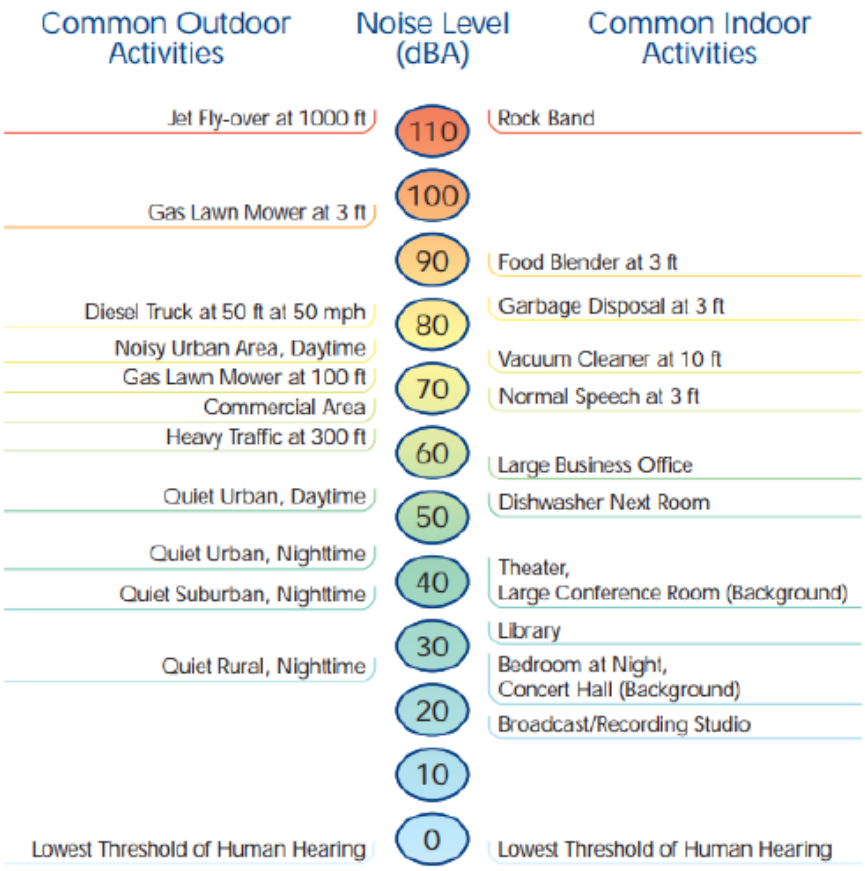
Noise Affects Use of Portable Air Cleaners

- Portable air cleaners are often used less frequently over time.
  - Some studies have noted/speculated that may be because of noise.

Sulser et al. **2009** *Int Arch All Immunol*;
Batterman et al. **2012** *Indoor Air*

- EPA maintains that interference and annoyance occurs at indoor noise levels above 45 dBA.*

- Many portable air cleaners exceed this threshold.
  - But quantified noise is not used as a standardized performance factor in the United States and is not routinely available on product packaging.



www.dot.ca.gov/dist2/projects/sixer/loud.pdf

*Source: archive.epa.gov/epa/aboutepa/epa-identifies-noise-levels-affecting-health-and-welfare.html

Directing Air Movement

Move Air from Clean to Less-Clean Area- increase exhaust

Nurse's Exam Room

Remove contaminated air

- Restrooms
- Laboratories
- Art and Shop Rooms

Other Important Considerations

Use of pedestal fans is not recommended

- Can blow around contaminants
- Can interfere with existing air flow pattern

Do not use ozone generators, electrostatic precipitators and ionizers, or negative ion air purifiers- they can produce harmful by-products

Preventative Maintenance is KEY

When filter changes aren't timely

- Lack of air flow/IAQ complaints
- Harder to pull air through them
- HVAC units burn out
- Changing filters cheaper than HVAC units!

When fan belts break:

- Poor air quality
- IAQ complaints
- Lack of confidence in maintenance

Periodic Inspections – Air Intake

- **Look at Air Intake**
  - Is it near a source of air pollution?
    - Above an exhaust vent?
    - Below the roof and next to a parking garage?
  - Is there mold growth?
    - Check for excessive mold growth on roof near intake

Periodic Inspections- Inside Air Handling Unit

Look Inside Unit -Proper Installation of Filters is Critical

Is filter seated properly in frame

Look for cracks in seams- places for air to bypass filter

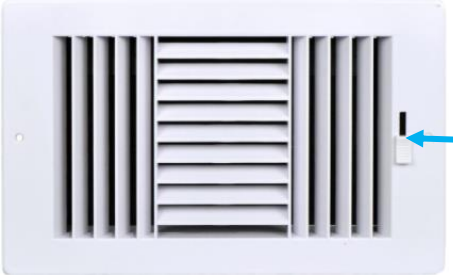
Periodic Inspections- Inside Air Handling Unit

- **Look at Coils**

- **Look for standing water, rust, and mold in drain pan**

Periodic Inspections – Inside Building

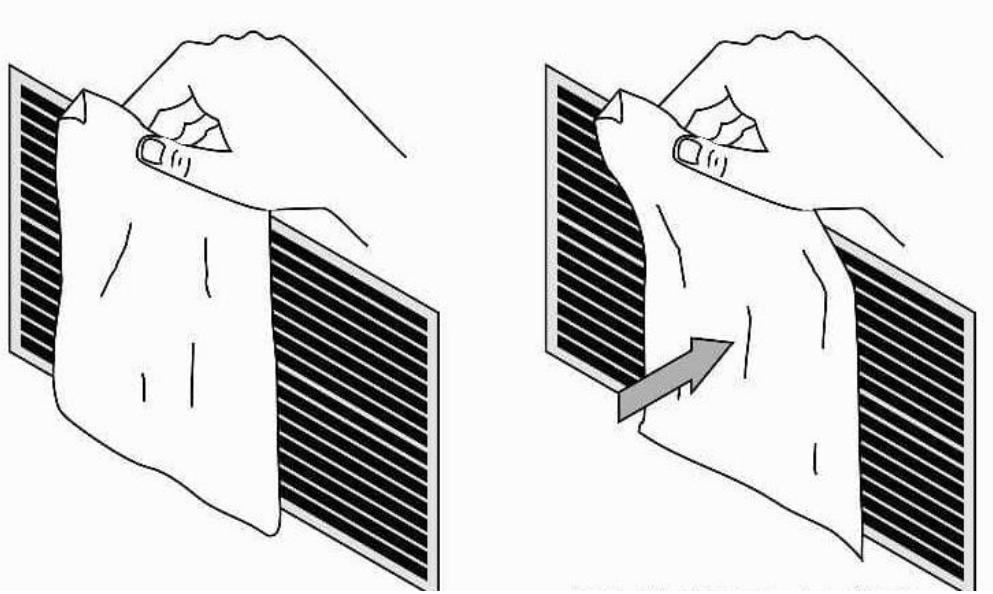
Are return grills blocked/dirty?



Is adjustable damper closed?

Periodic Inspections – Inside Building

Can you detect air movement? (tissue test)



Periodic Inspections – Inside Building

- Are you blocking ceiling diffusers?
- Is furniture blocking wall diffusers?

Ventilation Recommendations Summary

- Have your ventilation system checked and balanced by an HVAC engineer
- Bring in outside air 2 hours prior and after occupancy
- Open windows and doors to the extent possible to enhance dilution
- Reduce recirculation of air; increase/maximize OA
- Consider CO_2 monitoring
- Increase filtration to the highest level possible – MERV 13
- Supplement with portable HEPA filters if necessary
- Conduct periodic inspections of HVAC system and indoor environment
- NO ozone, electrostatic precipitators, ionizers, negative ion air purifiers

Supplemental Considerations to Mitigate COVID-19 Transmission in K-12 Schools (wa.gov)

Bus Transportation

School bus transportation is considered public transportation and is subject to mask requirements by federal order. Please see CDC's Requirements for Face Masks on Public Transportation for more information.

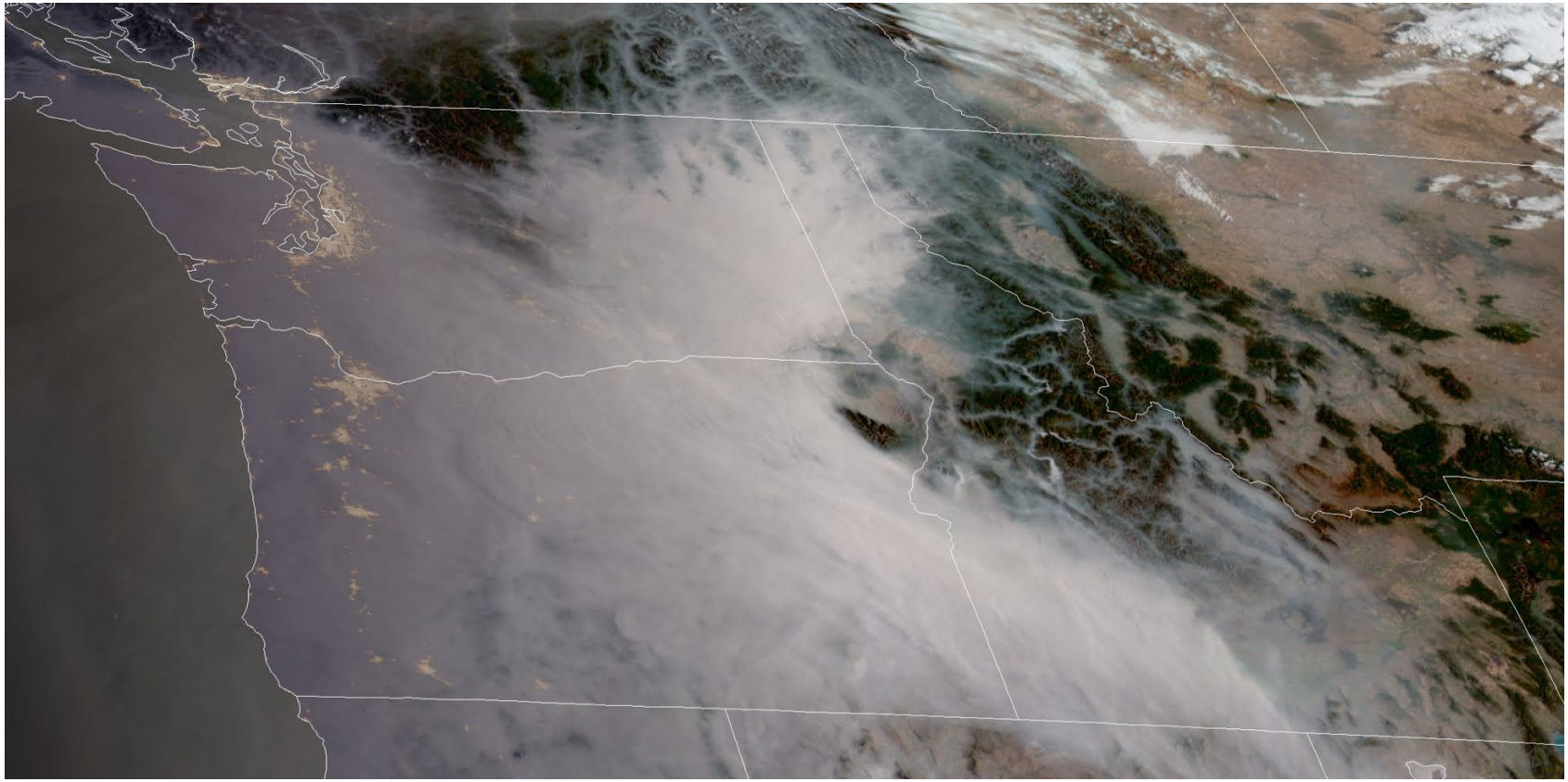
Optional strategies to further reduce SARS-CoV-2 transmission during school transportation include:

- Keeping riders as far apart as possible on the bus.
- Consider limiting occupancy.
- Use assigned seating.
- Seat students with household members or members of their school classroom/group/cohort.
- Maximize ventilation on the bus—open windows and roof vents whenever safe to do so.
- Clean and disinfect frequently touched surfaces, including the tops and backs of seats at the end of the day. Use an EPA registered product and follow the manufacturer's instructions for use. Do not fog/mist the bus with disinfectant. Leave windows open to air out the bus after runs and cleaning.
- Encourage walking or biking where safe.
- Encourage students to wash or sanitize hands when they leave their home or classroom before boarding the bus.

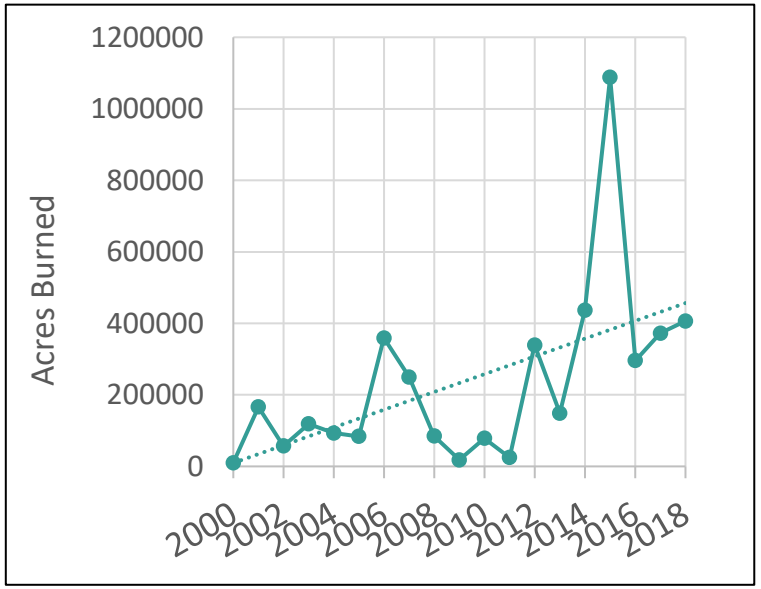
[Supplemental Considerations to Mitigate COVID-19 Transmission in K-12 Schools (wa.gov)]

- "At minimum fully open the front two windows and the second to last two windows."

Wildfire Smoke



Increasing Trend of Washington Wildfires



- Annual area burned in Washington will increase 4X by 2040's
- Fire season in US is currently 78 days longer than in 1970

Sources: (1) Washington Tracking Network, Washington Department of Health."Wildfires". Data obtained from Northwest Interagency Coordination Center. Published: 25 February 2019. (2) Littell et al. Climate Change 2010. (3) USFS Wildland Fire Budget 2015.

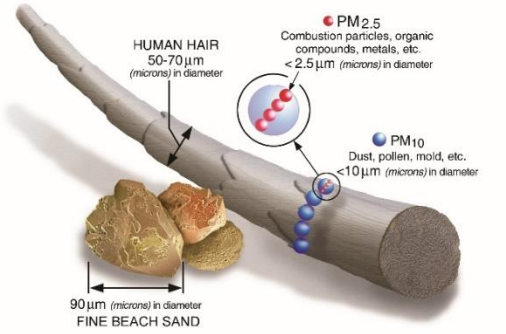
2021 Wildfire Season

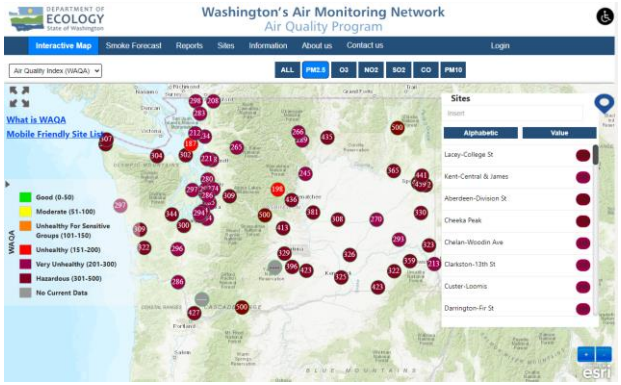
- Several big active fires
  - Cub Creek, Cedar Creek, Delancy Fire (North Central WA, Methow Valley)
  - Summit Trail + a few others (East WA, Colville Reservation)
  - Schneider Creek (Yakima Area)
- Minimal wildfire smoke impacts West of the Cascades
- East of the Cascades have had several smoke events where there was poor air quality for several days
- Several areas near big fires (Methow & Okanogan Valley, Colville Reservation) have had smoke for weeks with varying levels
- Air quality alerts in effect for several counties

Wildfire smoke is a mixture of pollutants

$PM_{2.5}$ is 90% of the particle mass emitted from wildfires

- Particulate Matter ($PM_{2.5}$ and PM_{10})
- Ozone
- Carbon Monoxide
- Carbon Dioxide
- Hazardous Air Pollutants (HAPs)
- Volatile Organic Compounds (VOCs)
- Nitrogen Dioxide





September 12, 2020

Minor to deadly responses to wildfire smoke

- Eye, nose, and throat irritation
- Cough, wheeze, shortness of breath
- Cardiovascular morbidities
- Respiratory morbidities
- Psychological stress
- Overall increase in hospitalizations & deaths

Groups vulnerable to smoke from fires

- People with chronic conditions
  - Heart, lung, and circulatory diseases
- Infants and children
- People 65 years and older
- Pregnant women
- People of low socioeconomic status

These groups make up >40% of Washington's population.

Steps to protect health from smoke

1. Stay updated on current and forecasted air quality

- Check the air quality hazard level

2. Reduce exposure

- Avoid strenuous outdoor physical activity
- Limit time outdoors
- Stay indoors

3. Keep indoor air as clean as possible

- Keep windows and doors closed
- Improve the filtration of air
  - HVAC system with a MERV 13 filter
  - Portable air cleaner with a HEPA filter
  - DIY box fan filter
- Don’t add to indoor air pollution

4. Pay attention to symptoms

- Seek medical help if needed

Evidence suggests increased health risk of WFS and COVID-19

- Overlapping symptoms of wildfire smoke exposure and COVID-19
- If you have COVID-19, breathing in wildfire smoke may make your symptoms worse
- Wildfire smoke exposure can make you more susceptible to respiratory infections, likely COVID-19
- Research is emerging

Wildfire smoke linked to increase in COVID-19 cases and deaths

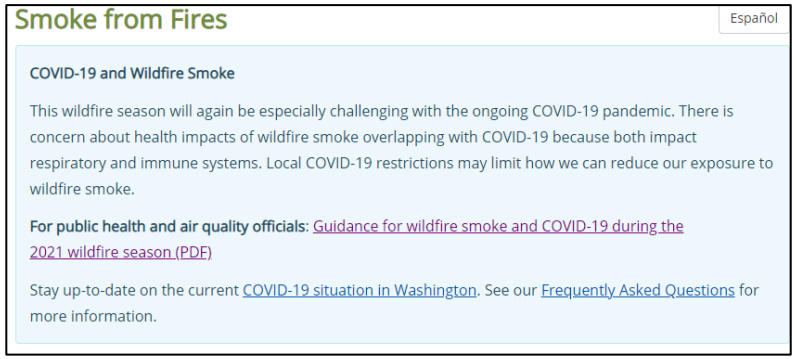
From August to October 2020, when fire activity was greatest, daily levels of PM2.5 during wildfire days were significantly higher than on non-wildfire days. Wildfires amplified the effect of exposure to PM2.5 on COVID-19 cases and deaths for up to four weeks. On average across all counties, a daily increase of 10 micrograms per cubic meter of PM2.5 for 28 days was associated with an 11.7% increase in COVID-19 cases and an 8.4% increase in deaths. The total number of COVID-19 cases and deaths attributable to daily increases in PM2.5 from wildfires were 19,742 and 748, respectively.

According to the authors, this study identified high levels of PM2.5 during wildfire days as a key factor in worsening the severity of the COVID-19 pandemic in the western U.S.

Citation: Zhou X, Josey K, Kamareddine L, Caine MC, Liu T, Mickley LJ, Cooper M, Dominici F. 2021. Excess of COVID-19 cases and deaths due to fine particulate matter exposure during the 2020 wildfires in the United States. Sci Adv 7(33):eabi8789.

Environmental Factor - October 2021: Extramural Papers of the Month (nih.gov)

Wildfire Smoke & COVID-19 Guidance



Smoke from Fires

Español

COVID-19 and Wildfire Smoke

This wildfire season will again be especially challenging with the ongoing COVID-19 pandemic. There is concern about health impacts of wildfire smoke overlapping with COVID-19 because both impact respiratory and immune systems. Local COVID-19 restrictions may limit how we can reduce our exposure to wildfire smoke.

For public health and air quality officials: Guidance for wildfire smoke and COVID-19 during the 2021 wildfire season (PDF)

Stay up-to-date on the current COVID-19 situation in Washington. See our Frequently Asked Questions for more information.

Washington State Department of Health

Updated: July 16, 2021

DOH 821-144

doh.wa.gov/smokefromfires

Recommendations for wildfire smoke and COVID-19 during the 2021 wildfire season (wa.gov)

Recommendations for wildfire smoke and COVID-19 during the 2021 wildfire season

The 2020 wildfire season was especially challenging as we continued to respond to the COVID-19 pandemic, and we will continue to have similar challenges this year. There is concern about wildfire smoke overlapping with COVID-19 and increasing the health impacts. COVID-19 restrictions may limit current public health recommendations to reduce exposure to wildfire smoke and could complicate our public health response.

This guidance will help air quality and public health officials in Washington state respond to wildfire smoke events during these unique circumstances. Initially developed in 2020, these recommendations have been updated to reflect the current COVID-19 recommendations for the 2021 wildfire season. COVID-19 public health guidance may vary by region, and this guidance can be adapted to fit local needs.

Overlapping Health Impacts of Wildfire Smoke and COVID-19

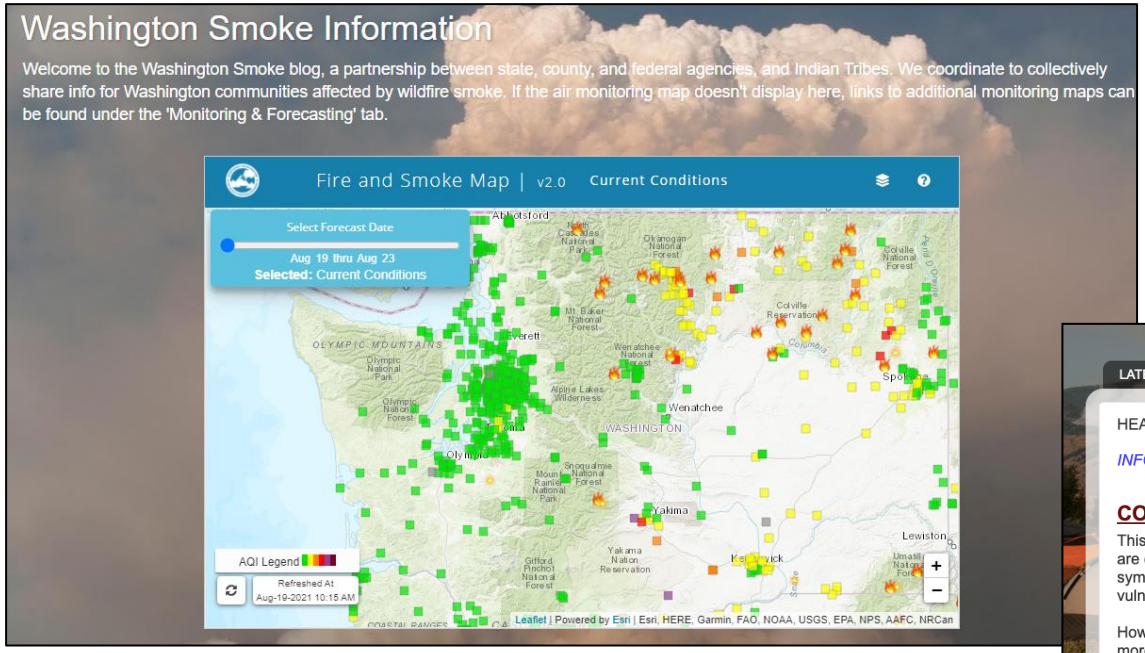
Breathing in wildfire smoke by itself can produce harmful health effects. These range from minor symptoms, such as eye, nose, and throat irritation or headaches, to more severe

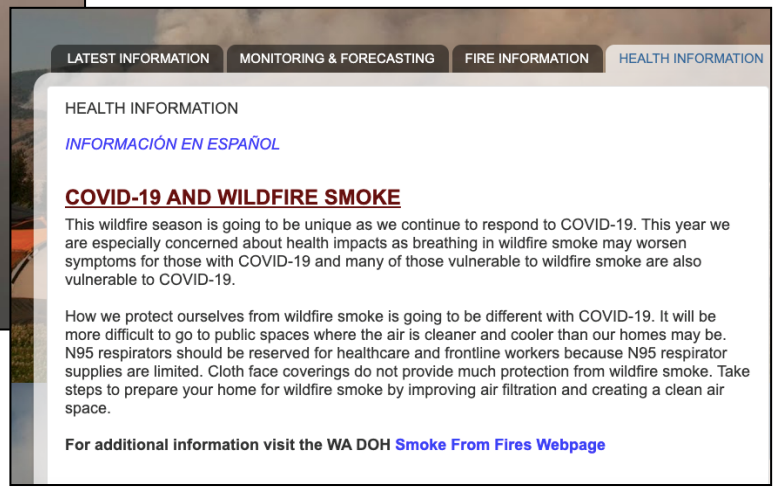
AQI / WAQA

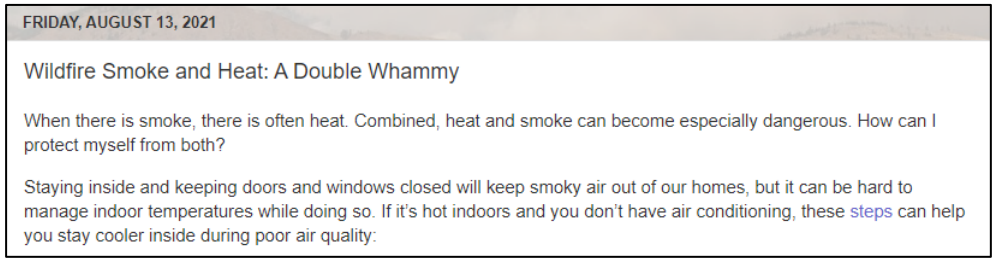
- In WA, there are currently two indexes used to communicate risk of air quality hazard to the public and decision-makers: EPA's Air Quality Index (AQI) and the Washington Air Quality Advisory (WAQA).
- Increasing frequency and intensity of wildfire smoke events have heightened a variety of challenges for air quality and public health partners related to the co-existence of two indexes.
- DOH & ECY assessed solutions to communicate air quality and associated health risks, including stakeholder engagement.
- The outcome is a recommendation to use AQI and shift away from the current use of WAQA to increase effective risk communication and alignment in public health guidance that will support decisions to protect health.
- DOH and ECY plan to implement this recommendation no later than April 30, 2022. We will be accepting feedback on the recommendation to use AQI and the best approach for implementing the change through Nov. 30. For more information visit here or email airquality@doh.wa.gov.

WA Smoke Blog

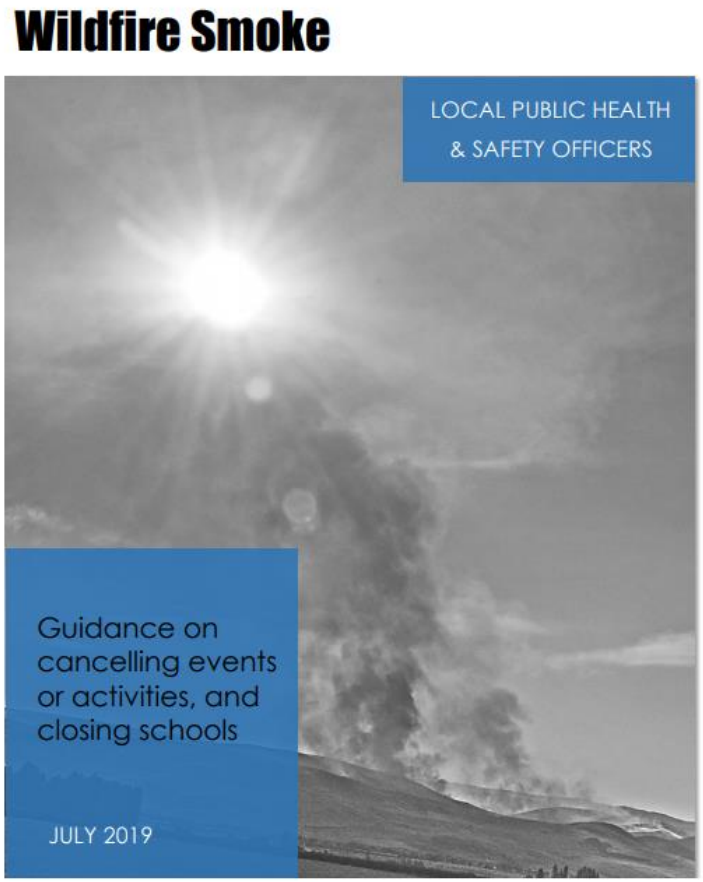
wasmoke.blogspot.com







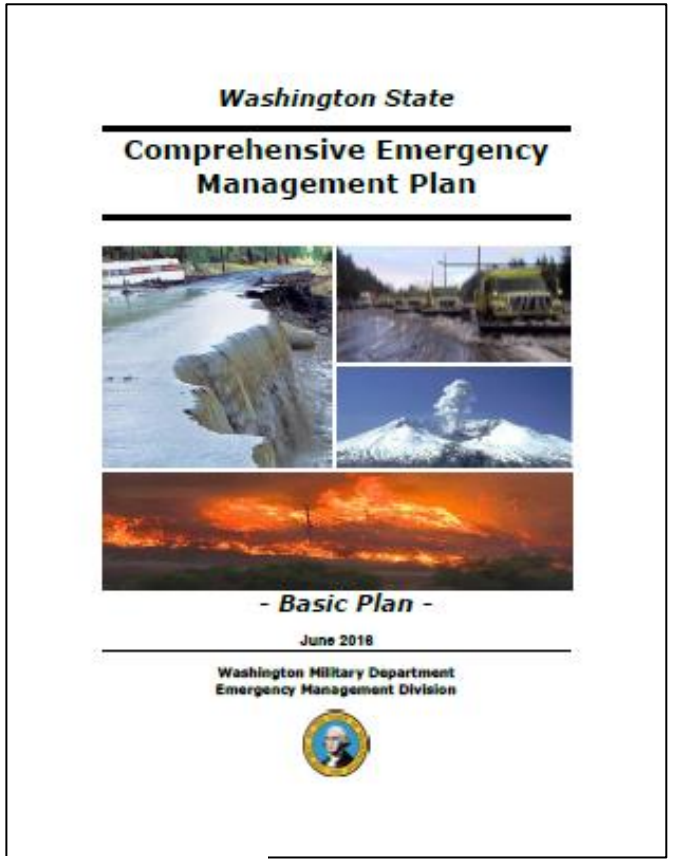
Health Guidance for Decision Makers



DEPARTMENT OF ECOLOGY State of Washington

Washington State Department of Health

https://www.doh.wa.gov/CommunityandEnvironment/AirQuality/SmokeFromFires/SmokefromFiresToolkits



Attach 1 "Wildfire Response—Severe Smoke Episodes": http://mil.wa.gov/uploads/pdf/PLANS/esf-8-appendix-5-attachment-1-severe-smoke-episodes-2017.pdf

Air Pollution and School Activities Guide

	Air Quality Conditions* First, check local air conditions at https://fortress.wa.gov/ecy/enviwa/ and then use this chart.				
	Good	**Moderate**	**Unhealthy for Sensitive Groups**	**Unhealthy**	**Very Unhealthy/ Hazardous**
Recess (15 minutes)	No restrictions.	Allow students with asthma, respiratory infection, lung or heart disease to stay indoors.	Keep students with asthma, respiratory infection, and lung or heart disease indoors.	Keep all students indoors and keep activity levels light.	Keep all students indoors and keep activity levels light.
P.E. (1 hour)	No restrictions.	Monitor students with asthma, respiratory infection, lung or heart disease. Increase rest periods or substitutions for these students as needed.	Keep students with asthma, respiratory infection, lung or heart disease, and diabetes indoors. Limit these students to moderate activities. For others, limit to light outdoor activities. Allow any student to stay indoors if they don't want to go outside.	Conduct P.E. indoors. Limit students to light indoor activities.	Keep all students indoors and keep activity levels light.
Athletic Events and Practices (Vigorous activity 2-3 hours)	No restrictions.	Monitor students with asthma, respiratory infection, lung or heart disease. Increase rest periods and substitutions for these students as needed.	Students with asthma, respiratory infection, lung and heart disease, or conditions like diabetes shouldn't play outdoors. Consider moving events indoors. If events are not cancelled, increase rest periods and substitutions to allow for lower breathing rates.	Cancel events. Or move events to an area with "Good" air quality — if this can be done without too much time spent in transit through areas with poor air quality.	Cancel events. Or move events to an area with "Good" air quality — if this can be done without too much time spent in transit through areas with poor air quality.

Source: WA Dept of Health; www.doh.wa.gov/Portals/1/Documents/Pubs/334-332.pdf

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.

Planning-Framework-for-Protecting-Commercial-Building-Occupants-from-Smoke-During-Wildfire-Events.pdf (ashrae.org)

SECTION 2.3: CONSIDERATIONS FOR SARS-COV-2

HVAC filtration and air cleaning recommendations for smoke and SARS-CoV-2 are similar due to similar respirable particle sizes. The difference is the outdoor air ventilation rate: a low rate is desirable for smoke control and a high rate is desirable for removal of SARS-CoV-2 virus particles (8,9). Additionally, improved HVAC filtration must be located in the recirculation air to mitigate risk from SARS-CoV-2.The building manager's challenge is to monitor system components and indoor conditions and change system settings as outdoor air quality changes to balance potential tradeoffs between smoke and SARS-CoV-2 exposure. Portable air cleaners with a HEPA filter (or other high efficiency filters) may be helpful in removing virus particles as well as smoke particles without increasing the amount of outdoor air. Additional COVID-19 considerations for cleaner air spaces and cleaner air shelters are available (10).

10 Elements of a Smoke Readiness Plan

The planning framework identifies the following elements that building managers should include in a written, building-specific Smoke Readiness Plan:

1. Purchase smoke preparation supplies, such as portable air cleaners and extra filters.
2. Evaluate the ability of the HVAC system to handle a higher efficiency filter. (The planning framework recommends MERV 13 or higher filters during smoke events.)
3. Conduct a full maintenance check on the HVAC system and make repairs if needed.
4. Assess and maintain adequate air flows to protect occupant health and equipment during smoke events.

Recommendations for Reducing Wildfire Smoke in Commercial Buildings and Schools (epa.gov)

5. Prepare to add supplemental filtration at the intake air vent where possible.
6. Assess filter conditions by adding a port or pressure gauge to measure the filter pressure drop on at least one air-handling unit.

Technician examining HVAC system

7. Weatherize the building to limit smoke intrusion. Consider measures such as limiting allowable entrances to reduce smoke entry.
8. Prepare to monitor indoor $PM_{2.5}$ by purchasing one or more low-cost air sensors designed to measure the pollutant. These low-cost sensors can be used to show trends in $PM_{2.5}$ levels (i.e., whether $PM_{2.5}$ is increasing or decreasing). These low-cost sensors will not be as accurate as regulatory monitors, but can show whether your interventions are reducing indoor $PM_{2.5}$.
9. Determine how to create temporary cleaner air spaces within the building.

Checking air handling unit pre-filter

10. Anticipate sources of indoor $PM_{2.5}$, such as cooking, vacuum cleaning, use of printers or copiers and smoking, that can increase levels of $PM_{2.5}$ within the building.

Resources

- Coronavirus Response Resources from ASHRAE and Others: https://www.ashrae.org/technical-resources/resources
  - ASHRAE EPIDEMIC TASK FORCE *Core Recommendations for Reducing Airborne Infectious Aerosol Exposure* https://www.ashrae.org/file%20library/technical%20resources/covid-19/core-recommendations-for-reducing-airborne-infectious-aerosol-exposure.pdf
- EPA Ventilation and Coronavirus https://www.epa.gov/coronavirus/ventilation-and-coronavirus-covid-19
- NIST online tool for comparing impacts of ventilation, filtration, etc., on indoor aerosols: https://www.nist.gov/services-resources/software/fatima
- Schoen, L.J. (2020) Guidance for Building Operations During COVID-19 Pandemic, ASHRAE Journal, 62 (5), 72–74. *Do no harm. Good ventilation is good practice. Excellent time to check system, review O&M practice*

Resources

- Why Soap Works
  https://www.nytimes.com/2020/03/13/health/soap-coronavirus-handwashing-germs.html
- Safer Cleaning, Sanitizing and Disinfecting Strategies to Reduce and Prevent COVID-19 Transmission, UWDEOHS
  https://osha.washington.edu/sites/default/files/documents/FactSheet_Cleaning_Final_UWDEOHS_0.pdf
- Safer Disinfectants on EPA's List of Recommended Antimicrobial Products for use against Novel Human Corona Virus, Responsible Purchasing Network
  https://osha.washington.edu/sites/default/files/documents/Updated%20Safer%20Disinfectants%20List_March%2026%2C%202020.pdf
- Cleaning for Asthma-Safe Schools (CLASS), *CDPH*
  https://www.cdph.ca.gov/Programs/CCDPHP/DEODC/OHB/WRAPP/Pages/CLASS.aspx
- *Cleaning for Healthier Schools – Infection Control Handbook 2010*
  https://portal.ct.gov/-/media/Departments-and-Agencies/DPH/dph/environmental_health/eoha/pdf/CleaningforHealthierSchoolsFINAL2411pdf.pdf?la=en
- Informed Green Solutions
  http://www.informedgreensolutions.org/
- Characteristics of Selected Disinfectants
  http://www.cfsph.iastate.edu/Disinfection/Assets/CharacteristicsSelectedDisinfectants.pdf
- *Safer Products and Practices for Disinfecting*, 2014, SFDE, RPN
  http://www.sfenvironment.org/sites/default/files/fliers/files/sfe_th_safer_products_and_practices_for_disinfecting.pdf

An excellent presentation

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

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

Beginning in December 2020, the American College of Medical Toxicology (ACMT) and Pediatric Environmental Health Specialty Unit (PEHSU) will be co-hosting a joint mini webinar series predominantly focusing on safer disinfectant use in the new world of COVID-19.

The PEHSU program hosts a regularly scheduled series of scientific webinars. Their purpose is to provide a forum for regular discourse on scientific issues and to facilitate the development of educational material that will be made available on-demand to a wider audience and as part of their educational products offering.

The "Safer Disinfectant Use" mini webinar series will qualify for Continuing Education (CE) for healthcare professionals through the Centers for Disease Control. Instructions for claiming CE will be provided upon completion of the webinar. For those interested in obtaining CE for this series, please visit the PEHSU National Classroom Webinars page.

ACMT - Safer Disinfectant Use Webinars

COVID-19 Webinar: Navigating the Landscape of COVID-19 Transmission and Exposure Reduction – YouTube November 3, 2021
Excellent webinar on ventilation and filtration

New Video Released

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

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.

[The Importance of Filtration In Schools - YouTube]

[Importance of Ventilation in Schools - YouTube]

Tool Lending Library

Smart Buildings Center, NW Energy Efficiency Council (NEEC)

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

Lending "library" of diagnostic tools.

CO, CO_2, 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

206-538-0685

You can subscribe for updates.

Old Capitol Building
PO Box 47200
Olympia, WA 98504-7200

k12.wa.us

Washington Office of Superintendent of
PUBLIC INSTRUCTION
Chris Reykdal, Superintendent

February 10, 2021

( ) Action Required
(X) Informational

BULLETIN NO. 005-21 Executive Services

TO: Educational Service District Superintendents
School District Superintendents
School District Business Managers

FROM: Chris Reykdal, Superintendent of Public Instruction

RE: Allocation and Requirements of Federal ESSER II Emergency Relief Funds

CONTACT: See Contact Information on Page 5

BACKGROUND

Through early action, on February 10, 2021, the Legislature passed House Bill 1368. The bill establishes the process and framework for school districts to claim the second round of federal Elementary and Secondary School Emergency Relief (ESSER II) funds for reimbursement of allowable expenditures.

- School facility repairs and improvements to reduce risk of virus transmission and exposure to environmental health hazards, and to support student health needs.
- Inspection, testing, maintenance, repair, replacement, and upgrade projects to improve the air quality in school facilities, including heating, ventilation, and air conditioning systems, filtering, purification and other air cleaning, fans, control systems, and window and door repair and replacement.

Efficient and Healthy Schools Campaign

Framework for Effective School IAQ Management | US EPA

EPA is excited to partner with Department of Energy on the Efficient and Healthy Schools campaign, which aims to help K-12 schools—especially those serving low-income student populations—identify practical HVAC solutions and upgrades to improve energy efficiency while promoting healthier spaces for teaching and learning This campaign will promote peer-to-peer learning among school participants and will recognize schools for their best practices and exemplary solutions. The campaign will also engage supporters such as designers, engineers, consultants, and program implementers, to better support schools that are investing in efficient and healthy school buildings.

You can find out more about integrated energy management solutions as a technical solution to common IAQ issues in schools in the Framework for Effective School IAQ Management and learn about how to optimize energy efficiency upgrades without compromising occupant health through the resources below:

- **Energy Savings Plus Health: Indoor Air Quality Guidelines for School Building Upgrades**: This guidance outlines how you can equip your school district to integrate IAQ protections into energy efficiency retrofits and other building upgrade projects. Use the Basic Steps to Using the Energy Savings Plus Health Guidelines to find examples of typical school energy efficiency and building upgrade projects, as well as the potential IAQ and health risks and opportunities that may be encountered when executing these upgrades.
- **IAQ Tools for Schools On-Demand Webinars**: Find recorded webinars from technical experts, industry leaders and model school districts, such as Indoor Air Quality Plus Energy Efficiency: A Formula for Saving Money While Protecting Your School's Indoor Environment. This webinar explains the critical connection between IAQ and energy efficiency and the importance of properly integrating the two for optimal occupant health and building performance and proactive cost and energy savings.
- **EnergySTAR Event Recordings**: Find recordings from recent EnergySTAR events, including the August 17, 2021 webinar, *K-12 Schools: Resources and Approaches to Manage Indoor Air Quality and Energy Efficiency Together* (be sure to click on "View Events by Date" in the upper right corner of the page).This webinar builds the case for managing IAQ and energy efficiency together and outlines a variety of resources from partners to get schools started on the track to cost savings through preventive maintenance.
- **Back-to-School Webinar on Energy Savings and Healthy Indoor Air:** Watch this webinar from the Healthy Schools Network to learn more about how schools can achieve both energy efficiency and healthy indoor air, even in areas with high heat and humidity.

he pages.

ASHRAE Guidance

ASHRAE EPIDEMIC TASK FORCE

1. Public health guidance:
   - Follow CDC guidance on hand hygiene, masks, occupancy, etc.
2. Ventilation, filtration, air cleaning
   - Minimum outdoor air (OA) flow rates, use MERV 13 or better filters
   - Only use air cleaners for which evidence of effectiveness and safety is clear
3. Air distribution
   - Promote mixing (when directional airflow not required)
4. HVAC System Operation
   - Maintain temperature, humidity, clean air supply, flush spaces
5. System Commissioning
   - Verify systems are functioning as designed

www.ashrae.org/file%20library/technical%20resources/covid-19/core-recommendations-for-reducing-airborne-infectious-aerosol-exposure.pdf

JOHNS HOPKINS BLOOMBERG SCHOOL of PUBLIC HEALTH | Center for Health Security

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.

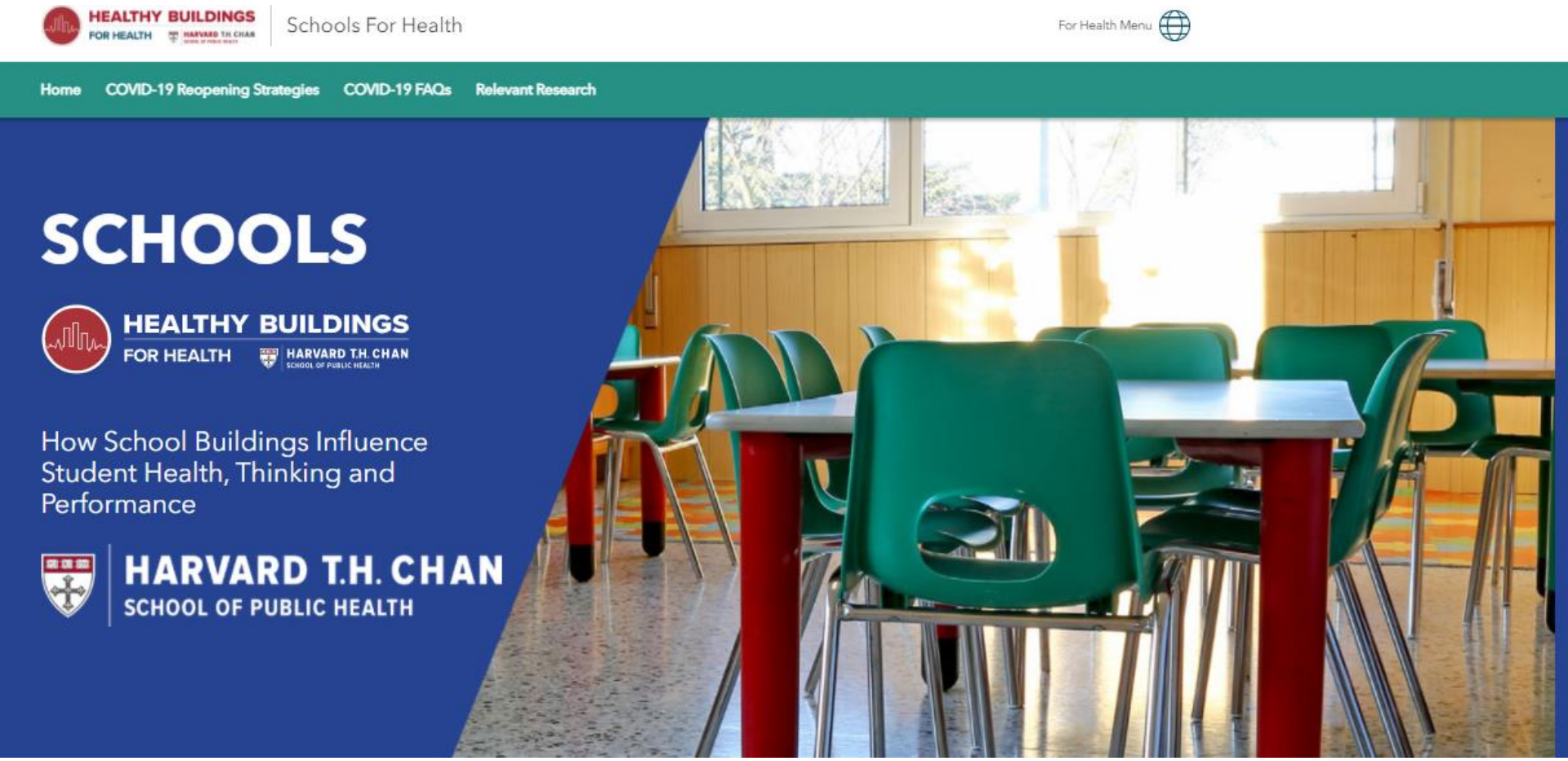
The new report, *School Ventilation: A Vital Tool to Reduce COVID-19 Spread*, reviews how improvements in building ventilation can reduce the risks of disease transmission. The report also summarizes current ventilation guidelines for K-12 schools and shares the results of an analysis finding that ventilation 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)

“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



COVID-19 + SCHOOLS: WHAT TO KNOW

VENTILATION GUIDE

5 STEP GUIDE TO CHECKING VENTILATION RATES IN CLASSROOMS

DOWNLOAD THE GUIDE

COVID-19 REPORT

RISK REDUCTION STRATEGIES FOR REOPENING SCHOOLS

READ THE REPORT

COVID-19 TOOLS

CALCULATORS FOR THE CLASSROOM

SEE ALL TOOLS

COVID-19 + SCHOOLS: RESEARCH AND NEWS

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

View Article

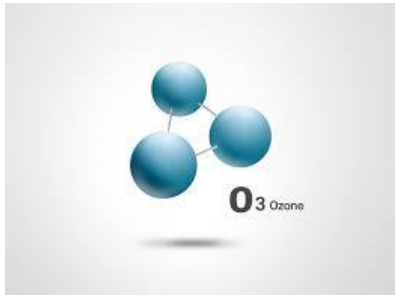
Washington Post: Don't let covid-19 keep kids from playing sports

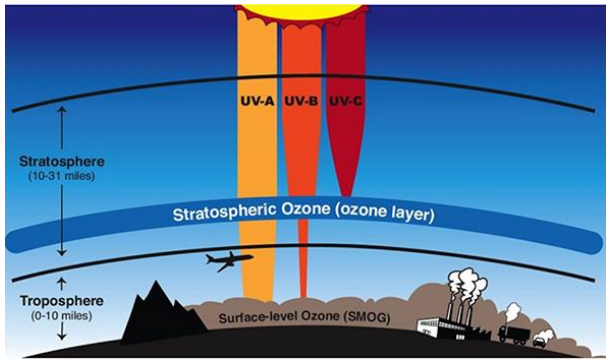
View Article

Updates to the Risk Reduction Strategies For Reopening Schools Report

View Article

Ozone concerns





- Ozone (O_3) is a reactive gas
- Harmful for human respiratory tract
- Safe levels below 10 ppb

- **AVOID** ionization or oxidation (may generate harmful ozone).
- Purchase technologies that have been **third party verified**.

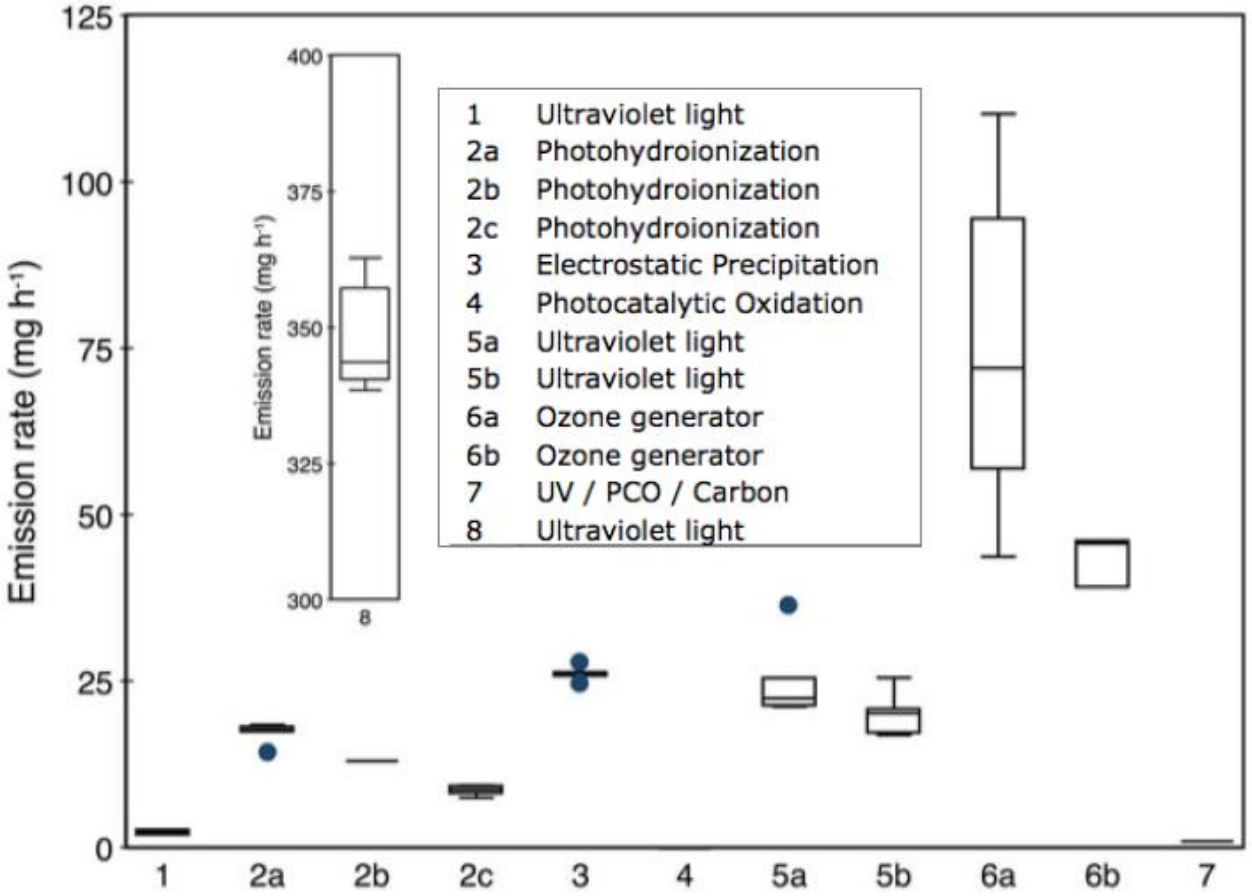
CALIFORNIA AIR RESOURCES BOARD

AHAM VERIFIDE

CR Consumer Reports

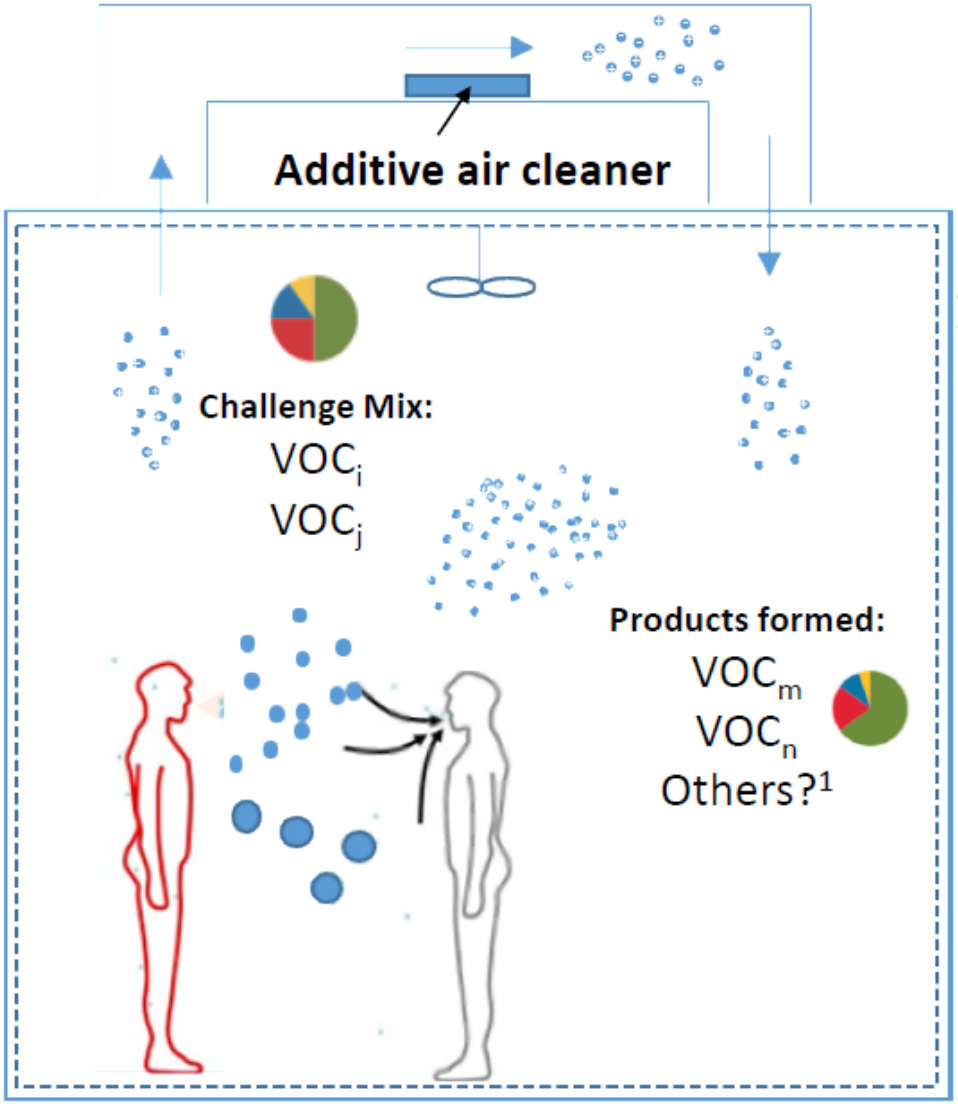
Ozone Emissions From Electronic Air Cleaners

- Some electronic air cleaners emit ozone (O_3) during operation.[1]
  - Ensure products meet UL 2998 standard (<5 ppb O_3 in chamber)

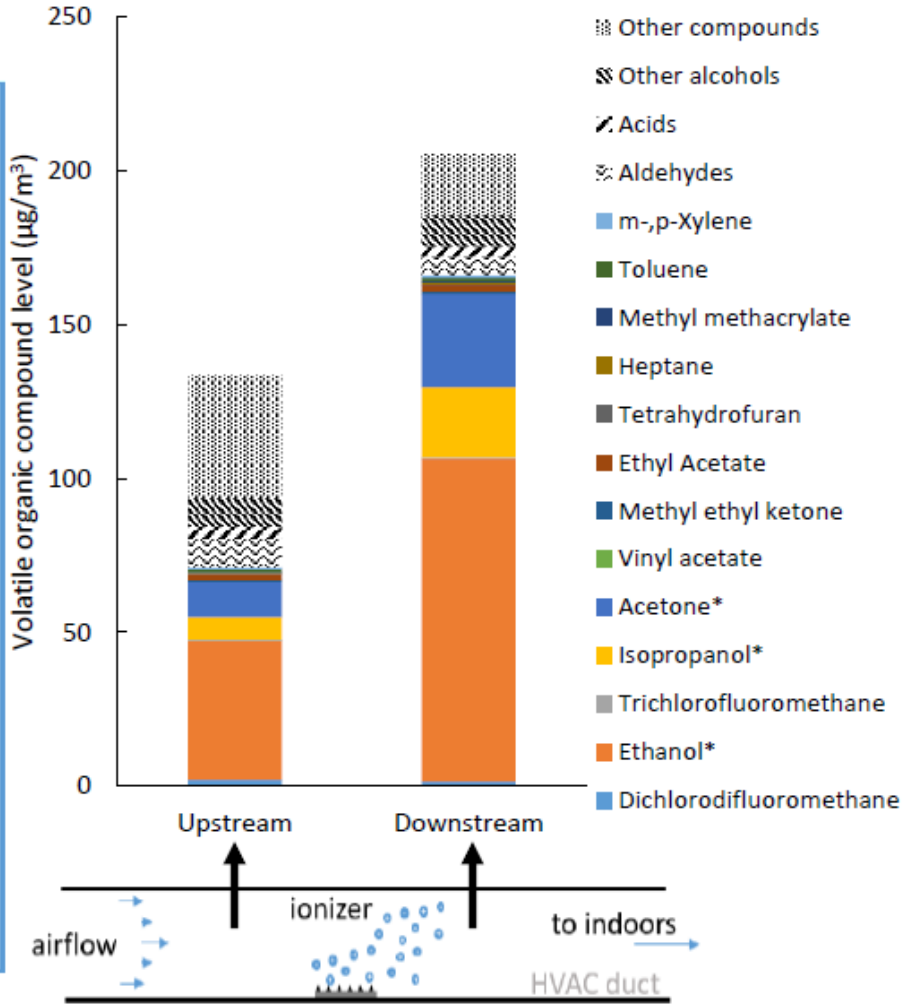


[1]Morrison et al., 2014 *CARB Report "In-duct air cleaning devices: Ozone emission rates and test methodology"*

Potential for Byproduct Formation



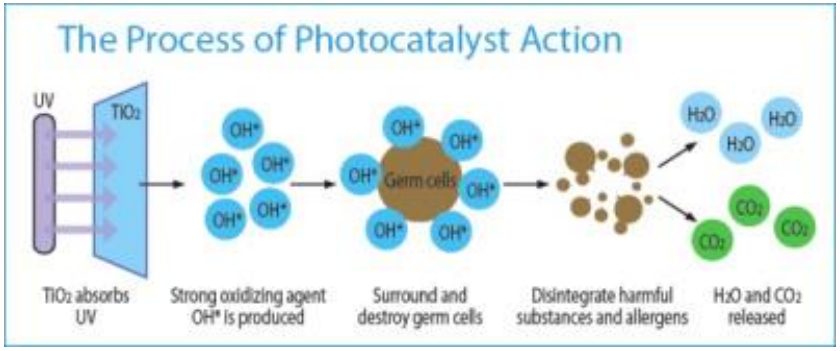
Example of byproduct measurements[2]



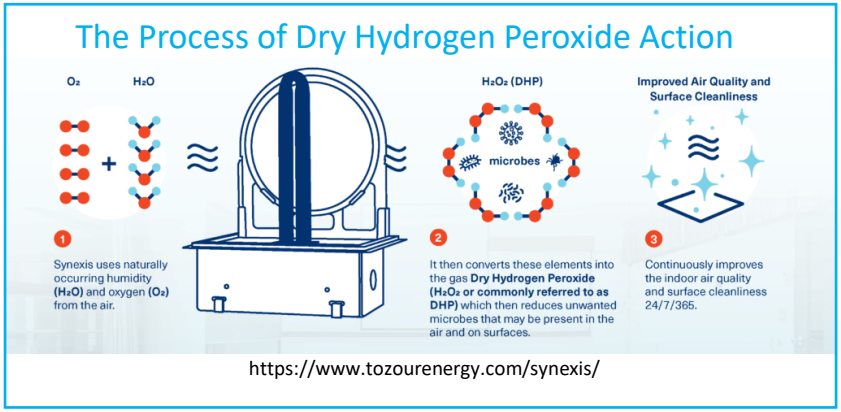
[1]Liu et al. 2020, *Indoor Air* 31:220-228; [2]Zeng et al. 2021, *Building and Environment* 195:107750

Photocatalytic Oxidation (PCO) and Dry Hydrogen Peroxide

- PCO uses UV light and a metal oxide (TiO_2)
- Some units claim disinfection by H_2O_2 gases formed
- Causes redox reaction of gases that destroy microbes
- By product formation possible
- ASHRAE statement:
  - Some air cleaners using PCO remove harmful contaminants to levels below limits for reducing health risks set by recognized cognizant authorities.
  - Some are ineffective in reducing concentrations significantly; manufacturer data should be considered carefully.



https://sciencedatacloud.wordpress.com/2013/11/22/photocatalyst-technology/

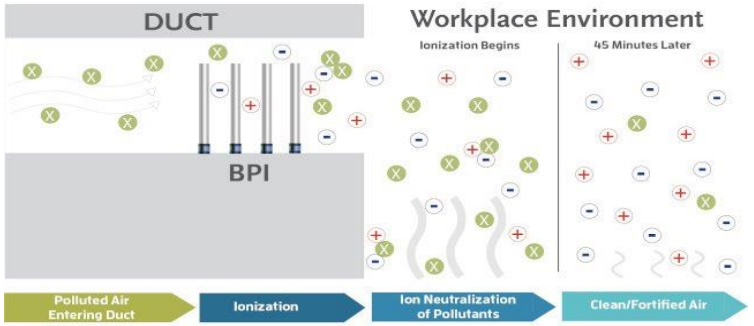


https://www.tozourenergy.com/synexis/

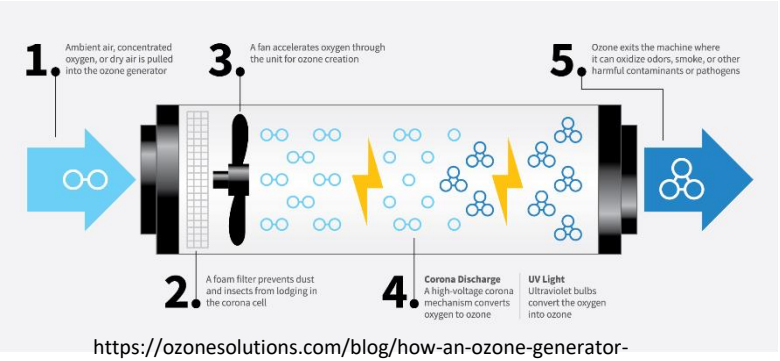
Bipolar Ionization/Corona Discharge/Needlepoint Ionization/Plasma Ion Generators/Other

- Use reactive oxygen species (ROS) or reactive ions (ozone, hydroxyl radicals, superoxide anions).
- Charged ions react with contaminants and germs in air.
- ASHRAE Statement:
  - Convincing scientifically-rigorous, peer-reviewed studies do not currently exist on these emerging technologies; manufacturer data should be carefully considered.
  - Systems may emit ozone, some at high levels. Manufacturers are likely to have ozone generation test data.
- Zhang et al. 2021 paper, other papers

- Some Portable HEPA Air Cleaners use these technologies!
- Air Cleaners, HVAC Filters, and Coronavirus (COVID-19) | US EPA



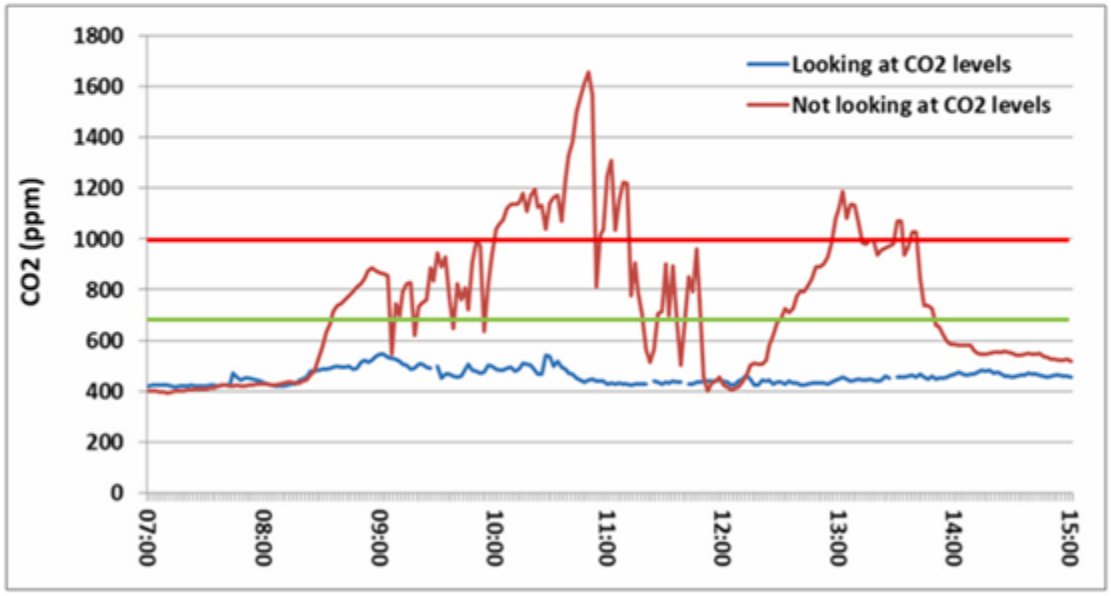
https://www.csemag.com/articles/covid-19-and-the-impacts-to-the-workplace/



https://ozonesolutions.com/blog/how-an-ozone-generator-works/

Research

When teachers could visualize the carbon dioxide levels in their classrooms, they opened windows and maintained effective air exchanges, which helps prevent COVID-19 transmission. *Environmental Research*



CO2 concentration monitoring inside educational buildings as a strategic tool to reduce the risk of Sars-CoV-2 airborne transmission - ScienceDirect

Research

[Poor ventilation worsens short-range airborne transmission of respiratory infection - Li - - Indoor Air - Wiley Online Library]

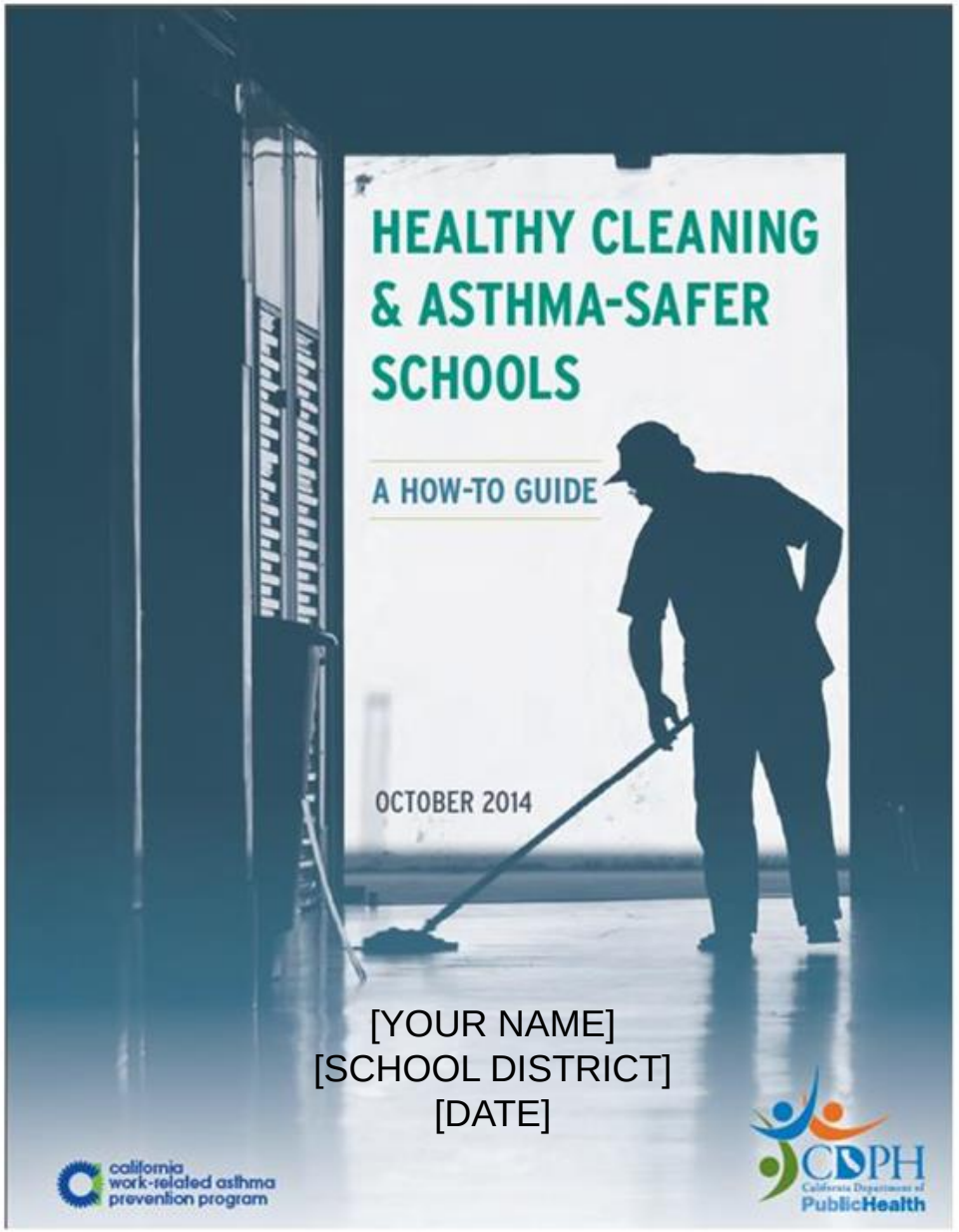
This study evaluates ventilation rate schema for respiratory infection control. In contrast to ASHRAE Standard 62.1, it recommends the ventilation rate be a function of distance between occupants and suggests that 21 cfm/person (10 L/s/p) would be a good minimum ventilation standard for respiratory infection control. *Indoor Air*

Guidelines for Cleaning, Disinfecting, and Handling Body Fluids in School – Appendix 8

OSPI *Infectious Disease Control Guide for School Staff* 2014

A. Standard Precautions
B. General Precautions
C. Hand Washing Procedures
D. Use of Gloves
E. Contaminated Needles, Broken Glass, or Other Sharp Items
F. Cardiopulmonary Resuscitation
G. General Housekeeping Practices
H. Disinfectants
I. Procedures for Cleaning and Disinfection of Hard Surfaces
J. Blood or Body Fluid Spills
K. Cleaning up vomit
L. Athletics
M. Procedures for Cleaning and Disinfection of Carpets/Rugs
N. Disposal of Blood-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

Staff and students deserve to work and learn in a safe and healthy school environment, and they can, since safer cleaning products and methods exist.



Resources - Safer Disinfectants

Safer Cleaning, Sanitizing and Disinfecting Strategies to Reduce and Prevent COVID-19 Transmission

Proper cleaning and disinfecting are important for reducing the spread of COVID-19. 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, 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 are most likely to get work-related asthma. Four out of five workers with job-related asthma in the U.S. were in areas during, or right after, cleaning was done.[1]

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.

DEPARTMENT OF ENVIRONMENTAL & OCCUPATIONAL HEALTH SCIENCES | UNIVERSITY of WASHINGTON | SCHOOL OF PUBLIC HEALTH deohs.washington.edu

https://osha.washington.edu/sites/default/files/documents/FactSheet_Cleaning_Final_UWDEOHS_0.pdf

SAFER DISINFECTANTS ON EPA'S LIST OF RECOMMENDED ANTIMICROBIAL PRODUCTS FOR USE AGAINST NOVEL HUMAN CORONA VIRUS

Responsible Purchasing Network

March 2020

Because there is an urgent need for clear and consistent information about cleaning, disinfecting and sanitizing practices that are most likely to remove and kill COVID-19, it is critically important for all of us to follow the guidance issued by the US Environmental Protection Agency (EPA) and CDC.

The US Environmental Protection Agency (EPA) has published – and *List N: EPA's Registered Antimicrobial Products for Use Against Novel Coronavirus SARS-CoV-2, the Cause of COVID-19.* List N includes over 350 EPA-registered disinfecting products that, according to EPA "have qualified under [its] emerging viral pathogen program for use against SARS-CoV-2, a coronavirus that causes COVID-19. Coronaviruses are enveloped viruses, meaning they are one of the easiest types of viruses to kill with the appropriate disinfectant product."

The Responsible Purchasing Network has identified and is promoting products on EPA's List N that are the safest from the perspective of protecting human health and the environment from toxic risks because they contain only antimicrobial ingredients (such as hydrogen peroxide, ethanol, or citric acid) that are not known to cause occupational asthma or cancer. These surface disinfectants can often replace chlorine bleach or quaternary ammonium chloride compounds, which have been linked to these adverse human health effects.

EPA's List N includes several of the safer hydrogen peroxide-based "safer" surface disinfectants that are recommended in San Francisco's *Safer Products and Practices for Disinfecting and Sanitizing Surfaces* report, which RPN helped to develop. These include, but are not limited to:

- Clorox Commercial Solutions® Hydrogen Peroxide Disinfecting Cleaner and **Clorox Healthcare Hydrogen Peroxide Cleaner Disinfectant** (EPA Registration No. 67619-24) a ready-to-use liquid with efficacy against a wide array of bacteria and viruses (including Human Coronavirus) with a 1-minute contact time.
- Clorox Commercial Solutions® Hydrogen Peroxide Cleaner Disinfectant Wipes and **Clorox Healthcare Hydrogen Peroxide Cleaner Disinfectant Wipes** (EPA Registration No. 67619-25), which have efficacy against a wide array of bacteria and viruses (including Human Coronavirus) with a 1-minute contact time.

RPN Responsible Purchasing Network

https://osha.washington.edu/sites/default/files/documents/Updated%20Safer%20Disinfectants%20List_March%2026%2C%202020.pdf

6 Steps for Safe & Effective Disinfectant Use

Step 1: Check that your product is EPA-approved
Find the EPA registration number on the product. Then, check to see if it is on EPA's list of approved disinfectants at: ***epa.gov/listn***

Step 2: Read the directions
Follow the product's directions. Check "use sites" and "surface types" to see where you can use the product. Read the "precautionary statements."

Step 3: Pre-clean the surface
Make sure to wash the surface with soap and water if the directions mention pre-cleaning or if the surface is visibly dirty.

Step 4: Follow the contact time
You can find the contact time in the directions. The surface should remain wet the whole time to ensure the product is effective.

Step 5: Wear gloves and wash your hands
For disposable gloves, discard them after each cleaning. For reusable gloves, dedicate a pair to disinfecting COVID-19. Wash your hands after removing the gloves.

Step 6: Lock it up
Keep lids tightly closed and store out of reach of children.

coronavirus.gov

[Six Steps for Safe & Effective Disinfectant Use (epa.gov)]

…pages.

Washington State Department of Labor & Industries | Safety & Health

Hazard Alert: Rubbing/Isopropyl Alcohol can be Hazardous to Workers' Health and Safety

COVID-19 created the need to wipe down and disinfect all surfaces touched by people in the workplace. Isopropyl or rubbing alcohol is a common chemical found in most disinfecting wipes and sprays. When workers breathe in the fumes in high concentrations or over a long period of time, it can make them sick.

Read about two Washington workers overexposed to hazardous amounts of isopropyl alcohol and how you can prevent it from happening in your workplace.

Available in English, Spanish, Russian, Vietnamese, Cambodian, Chinese Simplified, Chinese Traditional, Korean and Somali. Find a list of previous alerts at https://lni.wa.gov/safety-health/preventing-injuries-illnesses/hazardalerts.

If you would like assistance with your Hazard Communication Plan or help measuring workers' personal exposures to chemicals, please contact your local L&I safety & health consultant.

How Fragrance Harms our Health

We can inhale or absorb toxic fragrance chemicals into our bodies from fragranced products used in our homes and in public spaces. These exposures can have an impact on our health, including:

- **Skin allergies** to fragrance are well documented in scientific literature. 2-11% of the general population experience skin allergies to fragrance.
- **Both asthma and COPD** symptoms can be made worse by fragrance exposure.
- **Neurological impacts** such as migraines have been associated with fragrance. In the U.S. these types of reactions are quite common. In a national survey, **over 34% of respondents in the U.S. reported health problems**, such as migraine headaches and respiratory difficulties, in response to exposure to fragranced products.
- **Reproductive concerns** from exposure to certain fragrance chemicals include birth defects, premature birth, decreases in fertility and other effects.

https://www.womensvoices.org/beyondthelabel/health-hazards-in-scented-cleaning-products/

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

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

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.

WE SHARE THE AIR

No Scents is Good Sense!

PUGET SOUND
Educational Service District

Scented products contain hazardous chemicals which can cause serious problems for many people, especially those with asthma, allergies or sensitivities to chemicals.

EFFECTS OF SCENTED PRODUCTS FACTS:

- Scented products can cause a variety of health problems such as, but not limited to, sore throat, runny nose, sinus congestion, wheezing, shortness of breath, headache, mental confusion, inability to concentrate, flushing, irritability, nausea, or muscle pain.

The PSESD strives to ensure the safety and comfort of staff and visitors by encouraging a fragrance-controlled environment. We support a healthful environment for our staff members, clients and visitors. For the comfort and health of all, the PSESD discourages the use by employees and visitors of scents and fragrant products.

Local School Credits Handwashing Stations with Drop in Absences

Lake Charles, Louisiana

Posted: Nov 21, 2014 3:50 AM PST , By Britney Glaser, KPLCtv.com

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).
- An occupied room is considered to be receiving the minimum amount of fresh air when indoor carbon dioxide (CO_2) levels are approximately 700 parts per million (ppm) over outside ambient CO_2 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).
- 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%2f7o%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)
- School Indoor Air Quality Best Management Practices Manual, 2003 (PDF) (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)
- 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)

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Classroom Cleaning - Tips for Teachers

Cleaning for Health in the Classroom
Best Practices for Teachers

School Environmental Health and Safety Program

Washington State Department of Health

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

School and Indoor Air Quality Program

Washington State Department of Health

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
• Fragrance-free baby wipes.	• Disinfecting wipes.
• Paper towels (recycled content preferred).	• Non-alcohol-based hand sanitizer.

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 <u>not</u> 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.

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

Washington State Department of Health

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For people with disabilities, this document is available on request in other formats. Call 1-800-525-0127 (TDD/TTY call 711).

THANK YOU!

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Resources available:

www.doh.wa.gov/schoolenvironment

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