air aware 101

a quick guide to the air we breathe
and the tools we have to stay safe!



Clean air is a human right but unfortunately it is under attack. Even when we can't see smog or haze our air could be polluted with tiny toxins or particles that can harm our bodies.

Fortunately, we have the tools and information to know what is in our air and how to protect ourselves!

Children and old folks, disabled people, and individuals with previous chemical exposures or lung damage are at higher risk from polluted air.



You can access this zine online here:
tinyurl.com/AirAware101

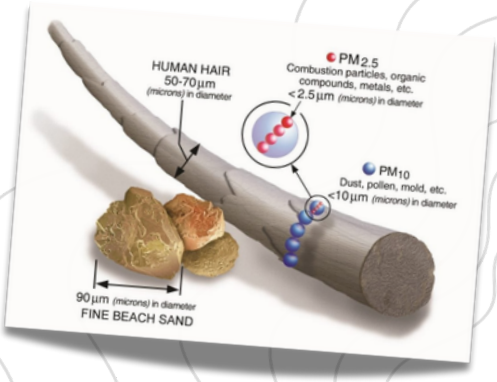
All links in the online version are underlined and blue indicating they are clickable to provide more information. Images highlighted in yellow are also hyperlinked.

If you would like a text only version you can use this link:
tinyurl.com/AirAwareText

In the U.S., particulate matter (PM) and ground-level ozone (O3) are two of the most prevalent forms of pollution impacting lung health.

Particulate matter (PM) consists of tiny liquid and solid particles in the air we breathe. PM comes from a wide variety of sources. This includes dirt, pollen, animals, fires, cooking, transportation and industrial sources. However, the majority is produced by burning fossil fuels.

Particle pollution comes in different sizes; the smaller the particle the deeper it can travel into your lungs which increase the potential for health impacts.



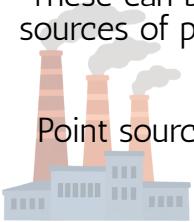
Ground Level Ozone (O3) or smog is created when sunlight reacts with Nitrogen oxides (NOx) and Volatile Organic Compounds. These pollutants often come from vehicle and industry emissions.

This is a health concern as smog can inflame and damage the airway and make the lungs more susceptible to infection.



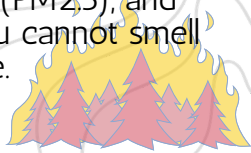
Point Source Pollution

Point Source Air Pollution is the term for a single identifiable stationary location or fixed facility which is creating air pollution. These can be man made or natural sources of pollution. Man made sources of point source pollution include things such as incinerators, refineries, and chemical plants.



Point sources of air pollution from natural sources include wildfire smoke and ash from volcanic eruptions.

Wildfire smoke in particular is becoming a common concern. This smoke can travel hundreds of miles from the fire. It is made up of particles, gasses, and water vapor. Wildfire smoke can contain: ozone, methane, sulphur dioxide, nitrogen dioxide, carbon monoxide, volatile organic compounds, fine particulate matter (PM2.5), and polycyclic aromatic hydrocarbons (PAHs). Even if you cannot smell it there are still risks from wildfire smoke.



Not all sources of air pollution will create pollution you can see with your naked eye. Things like benzene are invisible but can still cause damage to your health. If you are concerned about a point source of air pollution in your community especially if it is releasing smells and flaring or if you notice a change in your health we recommend submitting a complaint to your local environmental agency.



Air Quality Index

We have tools to help us understand, in real time, what is in the air we're breathing. This allows us to make informed decisions about our outdoor activities, running our air filters, or when to close our windows.

Air Quality Index (AQI): EPA's index for reporting outdoor air quality. It helps us understand how polluted the air is or is forecasted to be. Generally, the ozone AQI is an 8-hour forecast and the particle forecast is 24 hours.

The AQI is divided into six, color coded, categories.

Daily AQI Color	Levels of Concern	Values of Index	Description of Air Quality
Green	Good	0 to 50	Air quality is satisfactory, and air pollution poses little or no risk.
Yellow	Moderate	51 to 100	Air quality is acceptable. However, there may be a risk for some people, particularly those who are unusually sensitive to air pollution.
Orange	Unhealthy for Sensitive Groups	101 to 150	Members of sensitive groups may experience health effects. The general public is less likely to be affected.
Red	Unhealthy	151 to 200	Some members of the general public may experience health effects; members of sensitive groups may experience more serious health effects.
Purple	Very Unhealthy	201 to 300	Health alert: The risk of health effects is increased for everyone.
Maroon	Hazardous	301 and higher	Health warning of emergency conditions: everyone is more likely to be affected.

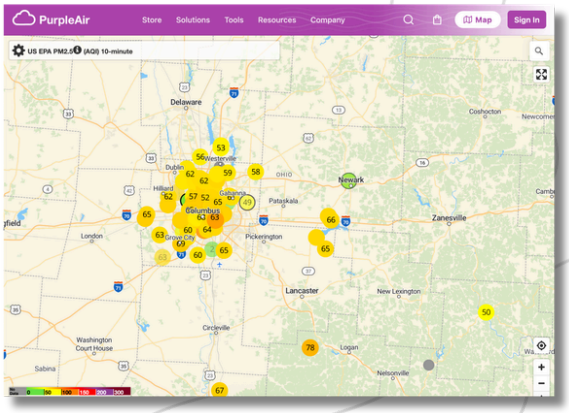
EPA has set health based standards for six pollutants. They have labelled these six criteria pollutants. They are widespread and have the potential to cause significant harm to human health and the environment. These six pollutants are: Carbon Monoxide, Lead, Nitrogen Dioxide, Ozone, Particulate Matter, and Sulfur Dioxide.

Real Time Air Quality

Find the AQI for your zipcode: www.airnow.gov/.



Find a real time map of particulate matter pollution:
map.purpleair.com/



You are also able to purchase a purple air monitor and set it up at your house for hyper local real time air quality data! These monitors can be used for both indoor and outdoor air quality monitoring.

If you are interested in learning more about the process to set up a purple air reach out to anaïs (apeterson@earthworksaction.org).

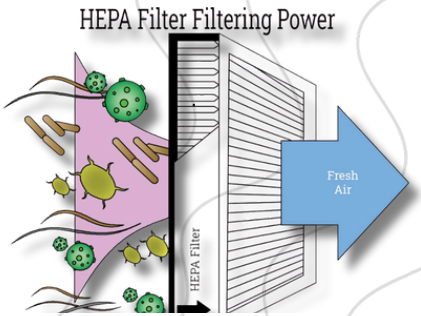
air filters

Air filters are an important and effective tool to clean the air to protect our health.

While not all air filters filter every pollutant you can purchase a filter that best addresses your needs and filters pollutants you are exposed to or concerned about.

Portable air filters contain something called a HEPA (high efficiency particulate air) filter. HEPA filters work for dust, dander, particles, smoke and spores. This includes airborne diseases, particulate matter pollution on bad air quality days, or even increased air pollution from frying foods! Make sure any filters you purchase are HEPA not HEPA like.

Portable air filters are designed to filter rooms not your entire house.



HEPA filters are not effective for gas removal as the gas will pass through the filter.

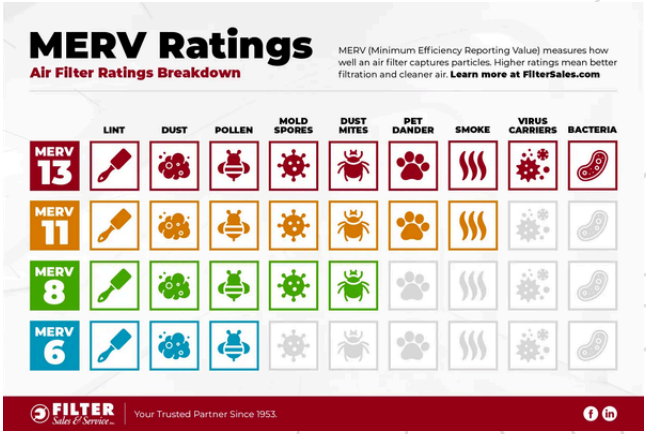
This means things like benzene, toluene, and other volatile organic compounds will not be removed. In order to filter gases you will need a filter with activated carbon or charcoal.

These filters will also address odors.

Filter Options

Your HVAC system can be upgraded with a more efficient filter. This will help filter all the air in your house.

The rating system for HVAC filters is known as MERV (Minimum Efficiency Reporting Value). The higher the MERV rating, the better the filter is at trapping specific sizes of particles.



Corsi Rosenthal Box (CR box) - This is a low cost and effective air filter using easily accessible supplies. To build a CR box you will need a box fan and four MERV furnace filters but you can also make a cheaper version with just one fan and a filter.

Unfortunately, there is no low cost DIY filter for gasses.

Other actions such as making sure your windows have good seals and not running portable air conditioners during bad air quality days to help keep your indoor air cleaner.

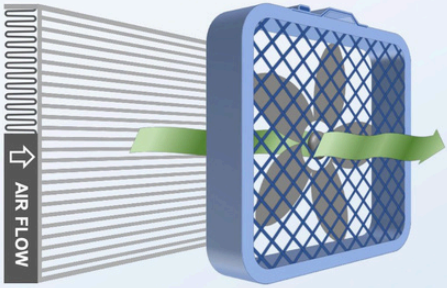
MERV Rating Chart

MERV Rating:	0.3-1.0 µm	1.0-3.0 µm	3.0-10.0 µm
MERV 1	Under 20%	Under 20%	Under 20%
MERV 2	Under 20%	Under 20%	Under 20%
MERV 3	Under 20%	Under 20%	Under 20%
MERV 4	Under 20%	Under 20%	Under 20%
MERV 5	Under 20%	Under 20%	20% - 34%
MERV 6	Under 20%	Under 20%	35% - 49%
MERV 7	Under 20%	Under 20%	50% - 69%
MERV 8	Under 20%	Under 20%	70% - 85%
MERV 9	Under 20%	Under 50%	Above 85%
MERV 10	Under 20%	50% - 64%	Above 85%
MERV 11	Under 20%	65% - 79%	Above 85%
MERV 12	Under 20%	80% - 90%	Above 90%
MERV 13	Under 75%	Above 90%	Above 90%
MERV 14	75% - 84%	Above 90%	Above 90%
MERV 15	85% - 94%	Above 95%	Above 90%
MERV 16	Above 95%	Above 95%	Above 90%
MERV 17	99.97%	Above 99%	Above 99%
MERV 18	99.997%	Above 99%	Above 99%
MERV 19	99.9997%	Above 99%	Above 99%
MERV 20	99.99997%	Above 99%	Above 99%

Pollutant Size	Type of Pollutant
.3-1.0 µm	smoke, dust, oil smell, bacteria, sneeze droplets
1.0 - 3.0 µm	car emissions, bigger dust particles (lead), legionella
3.0 -10.0 µm	hair spray, mold spores, mite debris, pet dander
10.0 µm +	pollen, sanding dust, cockroach debris, textile fibers

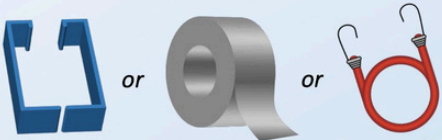
DIY Air Cleaner to Reduce Wildfire Smoke Indoors

Materials



20” X 20” air filter
Suggested rating: MERV 13

20” X 20” box fan
Only use certified fans with UL or ETL marking (2012 model or newer)



Clamps or **Duct Tape** or **Bungee Cords**

Assembly

1. Attach the air filter to the back of the box fan using either clamps, duct tape or bungee cords.
2. Check the filter for the direction of the air flow (marked on the side of the filter).
3. Replace filters when dirty.

Learn about box fan safety tips:
https://www.epa.gov/air-research/research-diy-air-cleaners-reduce-wildfire-smoke-indoors#FAQ

HOW TO BUILD A CORSI-ROSENTHAL BOX

The Corsi-Rosenthal Box is an affordable DIY air-cleaning system made with simple materials found in hardware stores. The box fan pulls air through the filters on the sides and blows out clean air. It is proven to reduce indoor exposure to airborne particles, including those containing the virus that causes COVID-19. The box can also decrease the levels of other particles in the air, such as dust or wildfire smoke.

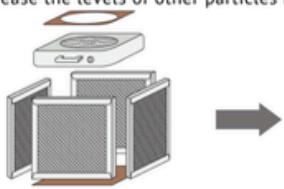
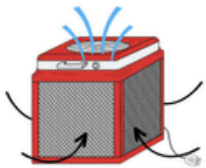


Illustration by Amanda Hu



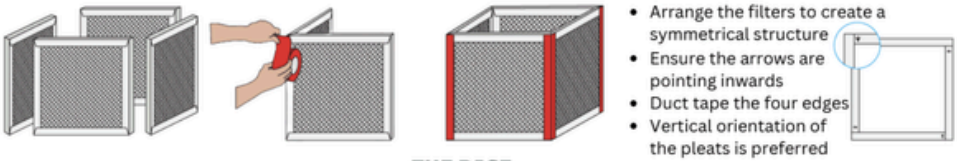
THE MATERIALS

- Filters can last up to a year
- Keep away from walls and corners



THE CUBE

- 4 Filters: 3M MPR 1900 (20" x 20" x 1" or 20" x 25" x 1") or MERV 13 (20" x 20" x 2" or 20" x 20" x 1" or 20" x 25" x 2" or 20" x 25" x 1" [2-inch preferred])
- Lasko or Mainstays 20-inch Box Fan
- Scissors, Utility Knife, Duct Tape



THE BASE

- Arrange the filters to create a symmetrical structure
- Ensure the arrows are pointing inwards
- Duct tape the four edges
- Vertical orientation of the pleats is preferred

Masks

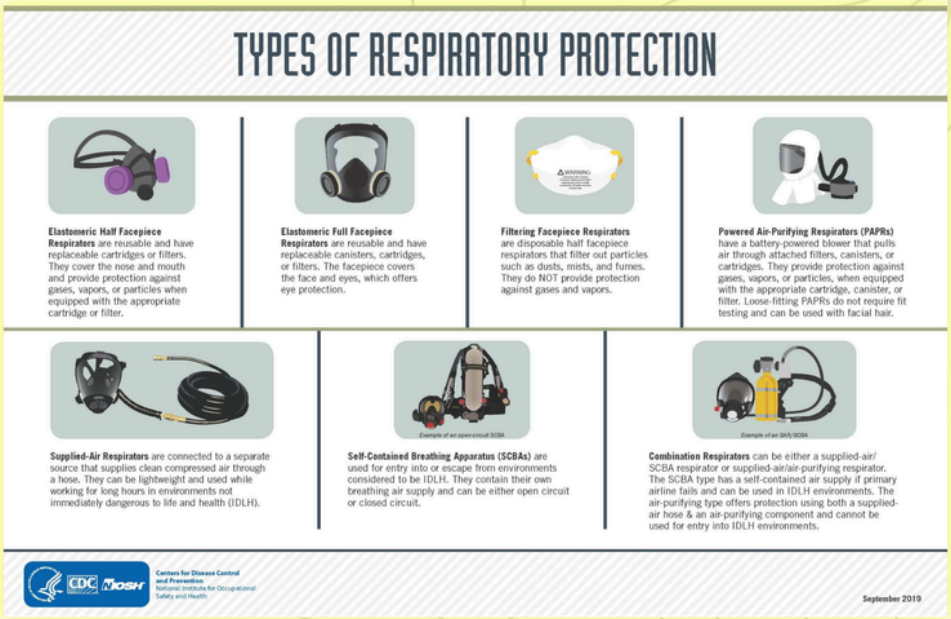
Similar to air filters, **masks are an important tool in our toolbox**.

Layered mitigations such as checking the air quality, running air filters, and wearing a mask help keep us as safe as possible.

Wearing a well fitting mask can keep you healthy by preventing the spread of disease, filtering air pollution, and keeping you safe in industrial settings.

There are also a variety of masks depending on what you are concerned about.

Even if you are wearing a mask, if you are not wearing it correctly, using incorrect filters, or can smell, taste, or otherwise detect the chemicals through a respirator you may not be protected!



Elastomeric Respirators

There are some masks that filter multiple things. Elastomeric respirators can filter for both gases and particles when using the correct cartridge.

Chemicals and gasses: Elastomeric half or full face respirators. These use different cartridges which filter for various things. These cartridges are color coded.



NIOSH Filter Color(s)	Protects against	Filters smoke?
Magenta	Particles only (P100)	✅
Magenta NL	Particles + Nuisance Level	✅
Magenta + Black	Particles + OV	✅✅
Magenta + White	Particles + AG	✅✅
Magenta + Yellow	Particles + OV + AG	✅✅
Magenta + Olive	Particles + OV + Ammonia + AG	✅✅✅
Black	Organic Vapors (OV)	❌
Bright Green	Ammonia	❌
White	Acid Gases (AG)	❌
Yellow	OV + AG	❌
Olive/Brown	OV + Ammonia + AG	❌

❌ = not sufficient for protection against wildfire smoke
✅ = filters smoke particles
✅✅ = filters smoke particles and some gases
✅✅✅ = filters smoke particles and all gases



N95s

Airborne disease: N95 or other high filtration mask such as kn95, kn94, or p100. A blue surgical mask is better than nothing but does not provide a good seal on the face and therefore it does allow unfiltered air to leak both in and out and undermines the effectiveness of the mask keeping you and others safe.

Covid is still an ongoing pandemic and while *everyone is still at risk* of contracting and spreading this dangerous virus, folks with underlying conditions or health concerns, old folks, and disabled people are at a higher risk.

Studies have found around 40% of covid cases to be asymptomatic meaning you will not feel sick or have any symptoms but you are still able to infect those around you.



Particulate matter and dust: N95 or other high filtration mask such as kn95, kn94, or p100. A blue surgical mask is better than nothing but does not provide a good seal on the face and therefore it does allow unfiltered air to leak both in and out and undermines the effectiveness of the mask.



Where to get masks:

We recommend purchasing masks through a reputable vendor, NOT amazon. Some options include behealthy, kind, and armbrust.

You can also purchase reusable n95 or better masks from flo or breathe99.

You can get free n95 level masks from a local mask bloc!
You can find your local mask bloc here: worldwide-maskbloc.org/

more information

Wildfire smoke: www.epa.gov/air-quality/wildland-fires-and-smoke

MERV ratings: www.epa.gov/indoor-air-quality-iaq/what-merv-rating

HEPA filters: www.epa.gov/indoor-air-quality-iaq/what-hepa-filter

ROCIS Portable Air Cleaners: rocis.org/portable-air-cleaners/

DIY Air cleaners: www.epa.gov/emergencies-iaq/diy-air-cleaners

Respirator guide: www.homedepot.com/c/ab/types-of-respirator-masks/9ba683603be9fa5395fab907a681adb

Covid as a worker's rights issue: rimoskyo.com/shop/p/covid-is-a-labor-issue-free-printable-download

Citations for covid as a worker's rights issue: docs.google.com/document/d/e/2PACX-1vTTQzfU_3D9AAYr78GZHly2AiVVrlE9Yg5rO8ArDzaIdChB7H6hanPYn4ATYKwwDhYEIJF1P2YkIlp2/pub

People's CDC: peoplescdc.org/

Pandemic Mitigation Collaborative: pmc19.com/

Environmental Health Project: www.environmentalhealthproject.org/resources

Group Against Smog and Pollution plain language air quality guide: www.gasp-pgh.org/understanding-air-quality