

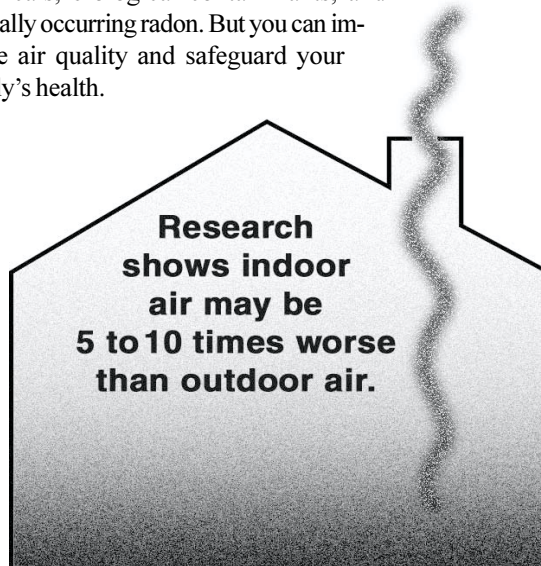


KY-A-Syst for the Home
Environmental Stewardship for Homeowners

Indoor Air Quality: Reducing Health Risks and Improving the Air You Breathe

Why Should You Be Concerned?

People spend 60 to 90 percent of their time indoors. This is a scary statistic, especially when research has shown that indoor air quality can be five to 10 times worse than outdoor air quality. If your home has poor air quality, your health can suffer. Some pollutants cause immediate health effects, while others threaten health after long-term exposure. Possible sources of indoor air pollution include combustion by-products (such as tobacco smoke and carbon monoxide), building materials, household chemicals, biological contaminants, and naturally occurring radon. But you can improve air quality and safeguard your family's health.



How Can KY-A-Syst Help?

This publication leads you through an evaluation of your home and property to determine pollution and health risks. After you have read this publication, walk around your home and property and answer the questions in the boxes, circling the answers that best apply. Your answers will help you become familiar with the physical characteristics of your homesite and identify potential problems so you can reduce the risk of air pollution in your home.

If you answer all questions with choice A, you have few risks to your indoor air quality. If you answer any question with choice B, you may have poor air quality. If you answer any question with choice C, you will want to consider making changes. Use the action checklist in this publication to help you.

Identifying and Controlling Potential Sources of Air Quality Problems

To address indoor air quality problems, you first need to find the source or sources. Addressing problems at the source is usually the most cost-efficient and effective approach. Think in terms of a specific pollutant, such as carbon monoxide or formaldehyde. Try to track down the physical source of the pollutant—a furnace or damp crawl space, for example. This publication calls attention to the most common types of indoor air pollutants and can assist you in identifying sources and action to take. While many pollutants are addressed, this publication does not cover all possible pollutants and their sources.

Combustion appliances—Heating and cooking devices often involve combustion, a chemical process that produces by-products that can become airborne and cause serious health complications. These devices include:

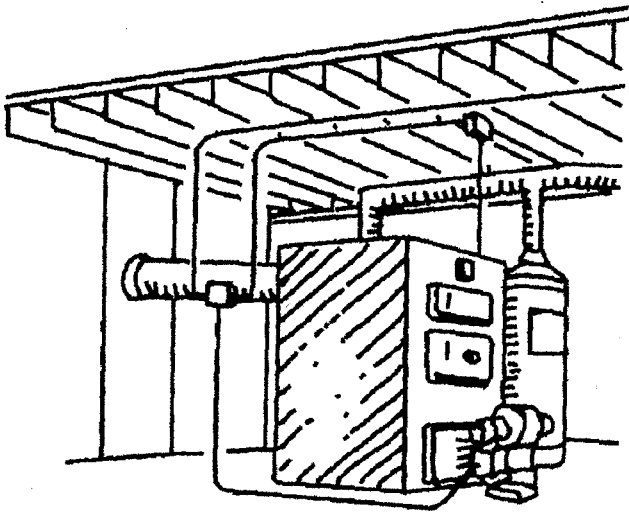
- oil and gas furnaces.
- wood and coal stoves.
- fireplaces.
- kerosene and gas space heaters.
- gas ranges, cook tops, and water heaters.

Even candles and oil lamps can add some carbon monoxide and other pollutants into the air.

Combustion by-products include carbon monoxide, nitrogen and sulfur oxides, and formaldehyde. It is important to properly vent appliances to the outside and maintain safety inspections. Even properly running systems can become dangerous if exhaust vents are blocked.

To determine the safety of your combustion appliances, call the dealer or a service professional for assistance. Heating systems should have yearly inspections, as should other fuel-burning appliances. Chimneys and flues should be inspected once a year as well.

Carbon monoxide—Using a carbon monoxide (CO) detector can help ensure the safety of your family. Carbon monoxide is an odorless, colorless gas that can result in death if exposure levels are too high for too long. Early symptoms include headache, fatigue, dizziness, nausea, and confusion. Blocked flue pipes, a malfunctioning furnace, or indoor use of a charcoal grill can result in excessive CO levels. Automobiles also produce carbon monoxide, so never leave a car running in a garage that is attached to your home. Carbon monoxide can leak into your home even when the garage door is open.



Gas furnace or water heater

Are your combustion appliances properly vented?

- A. All combustion appliances are vented directly to the outside.
- B. Unvented gas or kerosene heaters are used only in open spaces with a partially open window.
- C. Kerosene or gas space heaters are used frequently in closed rooms.

How often are maintenance checks performed on combustion appliances in your home?

- A. Chimneys, flues, gas or oil furnaces, wood stoves, and other combustion appliances are inspected and cleaned at least once a year.
- B. Chimneys, flues, gas or oil furnaces, wood stoves, and other combustion appliances have been inspected once or twice in the past five years.
- C. Chimneys, flues, and combustion appliances are not inspected, or the inspection record is unknown.

If your home has combustion appliances, are carbon monoxide detectors used?

- A. A carbon monoxide detector is properly installed, and it is tested weekly (if it runs on batteries).
- B. A detector is installed, but the battery is not tested regularly (if it runs on batteries).
- C. No carbon monoxide detector is installed.

Tobacco smoking—The smoke from cigarettes, cigars, and pipes contains a wide range of throat and lung irritants as well as hazardous and cancer-causing chemicals. A smoky home environment puts everyone at risk, not just the smoker. Children and asthmatics are especially at risk from secondhand tobacco smoke.

Is tobacco smoke an indoor air pollutant in your home?

- A. Tobacco smoking is not permitted in the home.
- B. Smoking is permitted occasionally but only in areas well ventilated to the outside.
- C. Frequent smoking causes smoky indoor air.

Building and repair materials—Pressed or manufactured wood products made from wood chips or sawdust are commonly used in home construction for flooring, shelves, and cabinets. Furniture, too, is often made of manufactured wood products. These products may contain glues that were made with formaldehyde, which can be released into the air and cause irritation for people who are sensitive to formaldehyde. Sealing the surface of a wood product, especially the edges, will reduce formaldehyde emissions. Manufactured wood products that are formaldehyde free or have low formaldehyde emissions are available.

New carpet also can release volatile chemicals from the carpet backing, padding, and fibers, as well as from the finishes that give carpeting its antistatic and soil-release properties. The Carpet and Rug Institute now tests carpets for emissions, so choose a carpet that is certified as a low-emissions carpet. Carpets of any age can trap chemical and biological pollutants that are carried in the air or tracked in from outside. Damp, dirty carpet is a breeding ground for biological pollutants. Regular cleaning and vacuuming can help reduce these problems.

Products such as paints, varnishes, and other surface finishes contain volatile organic compounds that release harmful vapors. Products that are oil-, solvent-, or alkyd-based release more harmful vapors than water-based products. Provide lots of extra ventilation when finishes are newly applied or apply finishes outside the home and wait until they are dry to bring finished items inside.

Until 1980, asbestos was used widely in buildings to increase fire resistance, heat insulation, and strength. When asbestos products age, they crumble and disperse tiny fibers into the air. If you breathe asbestos particles over time, they can accumulate in your lungs and lead to serious respiratory problems. Only a trained professional should work with asbestos surfaces that are damaged or part of a renovation project.

What type of building and repair materials do you use in your home?

- A. Low- or no-emission furnishings, building materials, paints, and varnishes are used, and new items are given adequate ventilation.
- B. New furnishings, building materials, paints, and varnishes are given increased ventilation.
- C. There is no attempt to select low-emission products, and extra ventilation is not provided when building and repair materials are used.

What type of carpet is installed, and how are the carpets maintained?

- A. Low-emissions carpets are selected and aired before and during installation. All carpeting is vacuumed and cleaned regularly.
- B. New carpet is installed without ventilation.
- C. All carpet is poorly maintained.

If your home was built before 1980, what is the condition of any asbestos in it?

- A. Asbestos is present but safely encased and isolated. Areas with asbestos are checked regularly.
- B. Asbestos is present and intact but located in high-traffic areas.
- C. Asbestos-containing materials are in poor shape and crumbling. People are exposed to the dust and fibers.

Biological contaminants—Biological contaminants come from living or once-living organisms. They mainly include animal hair, dander, saliva, and feces; molds and other fungi; dust mites; insect residue; pollen; and microscopic organisms. These contaminants can cause odors, damage household materials, lead to allergic reactions, and cause infectious diseases and respiratory problems. Each person has a different sensitivity to these contaminants.

Biological contaminants are found in every home and cannot be eliminated completely. Their growth can be controlled, however, by keeping surfaces clean and moisture levels low (see box on page 4). Many biological contaminants will multiply in damp or humid spaces. Good maintenance practices can control moisture and reduce the need for chemical products like pesticides and disinfectants.

Household dust includes some biological contaminants that are common allergens. Regular cleaning is needed to control these contaminants, including dusting with a treated cloth, damp cleaning, and laundering bedding with hot water. It may also be necessary to use a vacuum cleaner equipped with a high-efficiency (HEPA) filter to trap smaller particles.

Radon—Radon is an odorless, colorless, and tasteless radioactive gas found in small amounts in the earth. The concentration of radon at a particular location depends on the area's geology. However, excessive amounts of radon have been found in as many as 6 million U.S. homes. Data from a national testing firm revealed that 40 percent of the more than 27,000 homes tested in Kentucky since 1985 had radon levels above what is considered healthy. Radon exposure can increase your chances of lung cancer, especially if you smoke. Radon is measured in picocuries (pCi), and the recommended level of radon is 0a level less than 4 pCi/L (picocuries per liter) of air.

Materials Hazardous to Air Quality

Product	Hazard	Protective Equipment	Alternatives
Asbestos	Possible carcinogen if inhaled or ingested	Mask with HEPA or P100 filter	Leave in place if stable. Hire professional for removal.
Methylene chloride paint stripper	Carcinogen	No mask works well.	Use a product labeled safer than methylene chloride. Try n-methyl-2 pyrrolidone (NMP).
Lead-based paint	Lead in paint dust causes anemia, brain damage.	Mask with HEPA or P100 filter	Cover old paint if in good condition. Hire professional for sanding/scraping.
Adhesives, solvents	Lung/skin irritation, fatigue, dizziness	Mask with organic vapor cartridge	Use water-based adhesives.
Paint	Solvents irritate central nervous system.	Mask with organic vapor cartridge	Use water-based paints or those with low volatile organic compound content.
Drywall	Silica clogs lungs and causes silicosis, a fatal disease.	Air supply respirator	Hire professional for sanding.
Glass fiber insulation	Lung, eye, skin irritant	Mask with filter: dust/mist, HEPA, or P100	Hire professional for installation.
Particleboard	Formaldehyde is a lung and eye irritant.	Mask with dust/mist filter and formaldehyde cartridge	Use exterior plywood or solid wood.

How well is dust controlled in your home?

- A. Home is cleaned regularly. No furry pets are kept in the home, and it has little or no carpeting.
- B. Furry pets live in the home, but the home is cleaned regularly.
- C. Pet hair and dust are allowed to accumulate in living and sleeping areas. Home is mostly carpeted, and carpet is poorly maintained.

How well is moisture controlled in your home?

- A. There is no evidence of condensation in high-moisture areas or during warm, humid weather. Excess moisture is vented to the outside.
- B. There is evidence of condensation in high-moisture areas or during warm, humid weather. Exhaust fans are sometimes used.
- C. Damp air is not exhausted. Crawl space does not have a groundcover or vents. There are leaks, drips, or standing water in, around, or under the house.

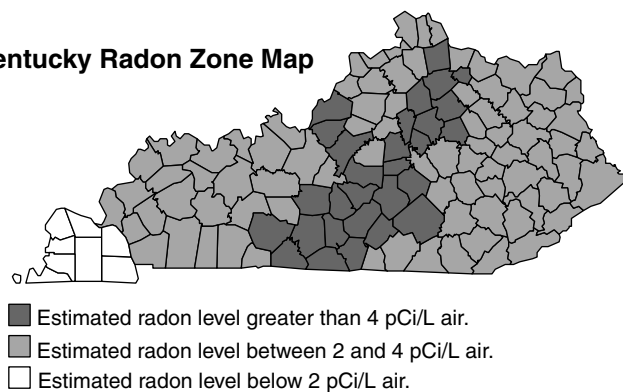
Tips for Controlling Moisture in the Home

- Prevent standing water, such as water in basements or the drip pans of refrigerators and air conditioners.
- Fix leaks and seepage problems immediately.
- Make sure rainwater drains away from your house.
- Use a vapor-proof ground cover (such as 4- to 6-mil plastic) in enclosed crawl spaces.
- Use fans that exhaust to the outside when bathing, showering, or cooking.
- Vent all combustion appliances to the outside.
- Use dehumidifiers and/or air conditioners to remove excess moisture in warm, humid weather.
- Avoid oversize air conditioners.
- Limit the use of humidifiers.
- Limit houseplants.

Is there radon in your home?

- A. A radon test was conducted properly, and radon levels are below the threshold for action.
- B. Radon is known to be present in my home at or near the threshold for action.
- C. Radon level is in excess of acceptable levels, or levels are unknown.

Kentucky Radon Zone Map



In Kentucky, above-average radon levels have been found in the Mammoth Cave area; in the triangle roughly bound by Louisville, Richmond, and Cincinnati; and in the Somerset area. See the radon zone map for Kentucky on this page.

The only way to know if you are at risk for radon exposure is to test your home. Check with your county office of the Cooperative Extension Service or your county health department for more information about radon testing. If you are building a new home, your county Extension office can offer suggestions for new construction that is radon resistant.

Indoor air ventilation—How many times have you “stepped outside for a breath of fresh air”? We all enjoy fresh air, but often we do not have it in our homes. Inadequate ventilation can cause a buildup of pollutants. If your home smells musty, stale, or like chemicals, you may need to increase ventilation.

Ventilation is needed in all homes, even in homes with few sources of contamination. Be aware of persistent odors of chemicals, mildew, or other contaminants. Lingering odors of grease and food may mean that your kitchen needs more ventilation. Many homes “leak” air, which may help maintain freshness but wastes energy. If you suspect the ventilation in your home is inadequate, consult an energy professional, who can help you properly ventilate your home without excessive energy loss.

How fresh is the air in your home?

- A. Indoor air usually smells clean in all seasons. Extra ventilation is provided as needed.
- B. Air is sometimes musty or has a detectable odor upon first entering the house.
- C. Air is almost always musty, damp, smoky, or smells like chemicals.

How well ventilated is your home?

- A. House is well ventilated. Exhausts fans are used regularly in the kitchen and bathroom.
- B. “Leaky” house gives some uncontrolled ventilation.
- C. House is built tightly and poorly ventilated. No exhaust fans are used.

Sources for More Information About . . .

- **Indoor air pollutants**
 - *Indoor Air Quality* (IP-23) by Larry R. Piercy, William Murphy, and Elwyn Holmes of the University of Kentucky Cooperative Extension Service.
 - *The Inside Story—A Guide to Indoor Air Quality* (call the Environmental Protection Agency at 800-438-4318 or visit the agency’s Web site at <www.epa.gov/iaq/>).
 - American Lung Association of Kentucky (call 502-363-2652 or visit the association's Web site at <www.kylung.org>).
- **Asbestos Removal**
 - Kentucky Division of Air Quality (call 502-573-3382).
- **Radon Testing and Prevention**
 - *A Citizen’s Guide to Radon*, *the Consumer’s Guide to Radon Reduction*, and *the Home Buyer’s and Seller’s Guide to Radon* (call the Environmental Protection Agency at 800-438-4318 or visit the agency’s Web site at <www.epa.gov/iaq/>).
 - Your county health department (check local listing).
 - Kentucky Radon Program, Kentucky Department for Public Health (call 502-564-4856 or visit the program's Web site at <publichealth.state.ky.us/radon.htm>).
 - The University of Kentucky Department of Biosystems and Agricultural Engineering Web site at <www.bae.uky.edu/ext/Program_Areas/Radon/radon.htm>.



What Is the KY-A-Syst for the Home Program?

The KY-A-Syst for the Home program is a series of publications that can help you be a good environmental steward of Kentucky and protect the health and well-being of your family. KY-A-Syst for the Home publications provide problem-solving information and also list agencies that can provide help in specific areas.

Action Checklist

Look back at the assessment questions and make sure you have answered all questions. Record all B and C responses and list the improvements or changes you plan to make. You can use recommendations from this publication or from other sources to help you decide on action you are likely to take. Write down a date to keep you on schedule. Read back through the assessment questions from time to time to see if any responses have changed and take any action needed to address new concerns.

Write all B and C responses below.	What can you do to reduce risk?	Set a target date for action.
<i>Sample:</i> A carbon monoxide detector is installed, but the battery is not tested regularly.	Test battery once a month.	The first day of each month.

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