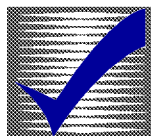




## HOW-TO BOOKLET #3406

# BIOLOGICAL POLLUTANTS



### TOOL & MATERIAL CHECKLIST

- |   |   |
|---|---|
| <input type="checkbox"/> Humidity Meter           | <input type="checkbox"/> Vacuum Cleaner             |
| <input type="checkbox"/> Exhaust Fan              | <input type="checkbox"/> Dehumidifier               |
| <input type="checkbox"/> Humidifier               | <input type="checkbox"/> Hydrogen Peroxide          |
| <input type="checkbox"/> Air Cleaner              | <input type="checkbox"/> HEPA Filter Vacuum Cleaner |
| <input type="checkbox"/> Ultraviolet Water Filter | <input type="checkbox"/> Air Conditioner            |

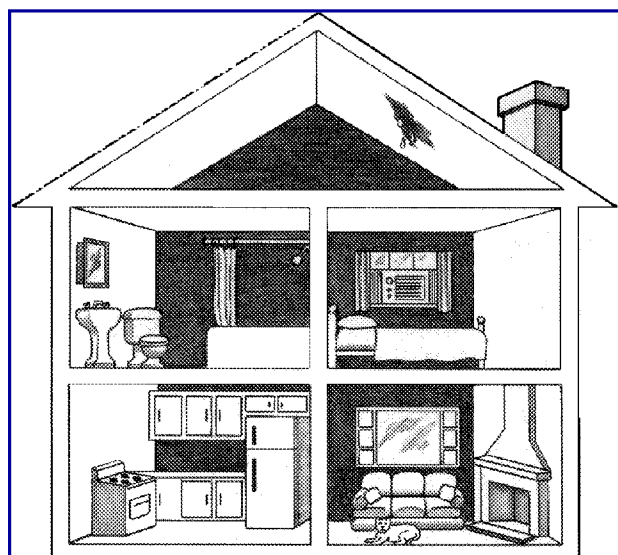
***Read This Entire How-To Booklet for Specific Tools and Materials Not Noted in the Basics Listed Above.***

Biological pollutants are (or were) living organisms. They promote poor indoor air quality and can be a major cause of days lost from work or school, and of doctor and hospital visits. Some can even damage the surfaces of structures inside and outside your house. Biological pollutants can travel through the air and are generally invisible. Some common indoor biological pollutants seen in **Figure 1** are:

- 🏠 Pollens which originate from plants.
- 🏠 Viruses transmitted by people and animals.
- 🏠 Animal dander (scales from hair, feathers, or skin).
- 🏠 Fleas, dust mites and insect parts.
- 🏠 Infectious bacteria carried by people, animals, soil and plant debris.
- 🏠 Organisms in drinking water.
- 🏠 Mold and mildew from excessive humidity or contaminated forced air systems.

**Health Effects.** We are all exposed to biological pollutants, but not all of us react to them the same way. Some people feel nothing, while others may experience an allergic or infectious reaction, or even toxic effects. Except for the spread of infections indoors, allergic reactions are the most common health problem stemming from poor indoor air quality. Allergic reactions are often connected with mold accumulation, animal dander (mostly from cats and dogs), house dust mites (microscopic animals living in household dust), and pollen. Symptoms range from mildly uncomfortable to life-threatening, as in a severe asthma attack.

**Reducing Pollutants in the Home.** Before you give away the family pet or move, there are less drastic steps you can take to reduce potential problems. Properly cleaning and maintaining your home helps reduce problems. People who have health problems such as asthma, or are allergic, may need to do this and more. Discuss this with your doctor.



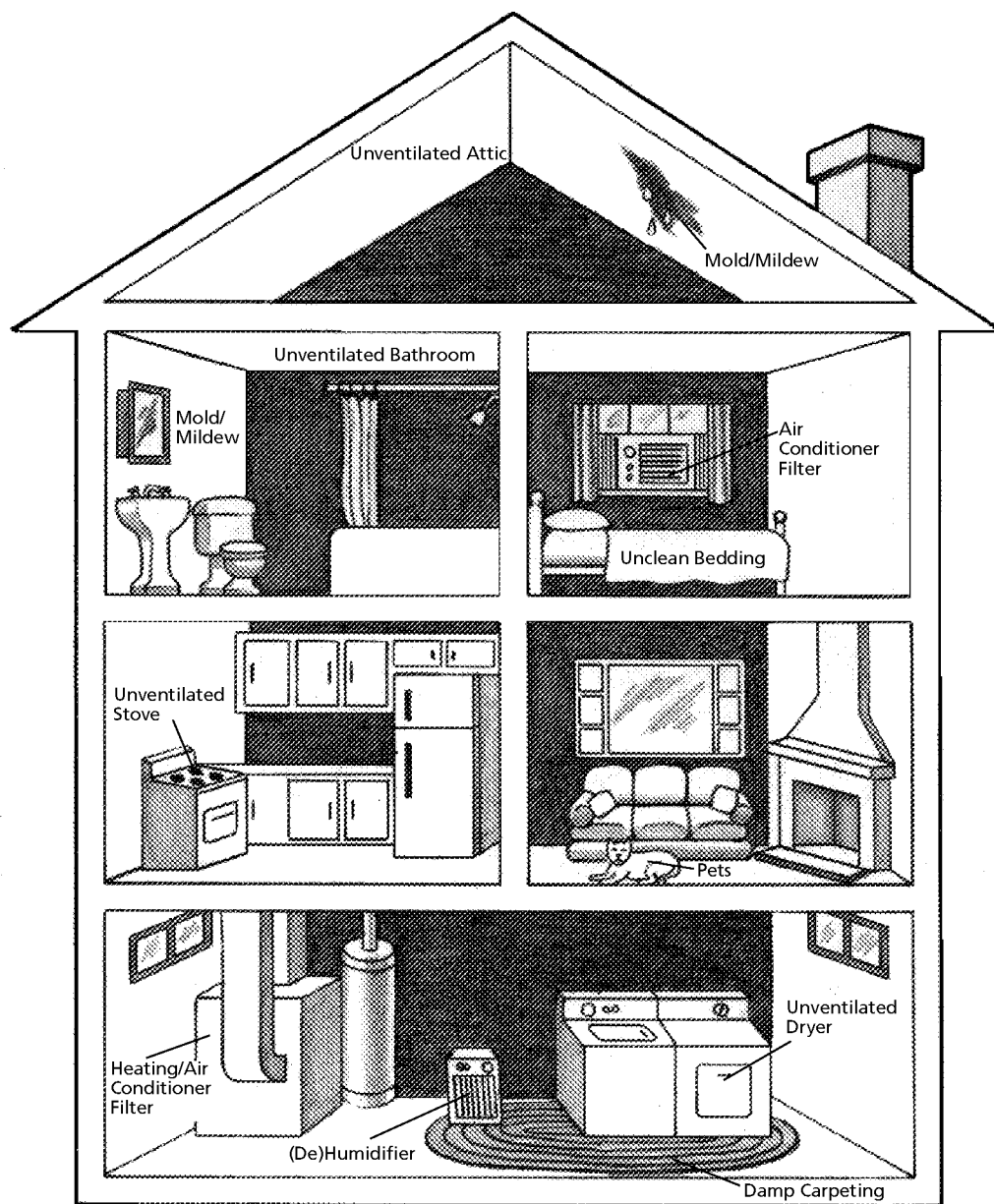


Fig. 1

### Sources of Biological Pollutants

## REMOVING MOISTURE

Water can be a carrier and transmitter of biological pollutants. Controlling water and moisture problems is a major element in ridding your house of dangers.

Water in your home can come from many sources. Water can enter your home through structural leaks or by seeping through basement floors. Showers and cooking can add moisture to the air in your home. The amount of moisture that the air in your home can hold depends on the temperature of the air. As the temperature goes down, the air can hold less moisture. This is why, in cold weather, moisture condenses on cold surfaces—seen as drops of water on the inside of a window. Moisture can encourage biological pollutants to grow. There are many ways to control moisture in your home.

**Install and Use Exhaust Fans.** Use fans that vent outdoors in kitchens and bathrooms. Clothes dryers must also vent outdoors. These actions can eliminate much of the moisture that builds up from everyday activities (Fig. 2).

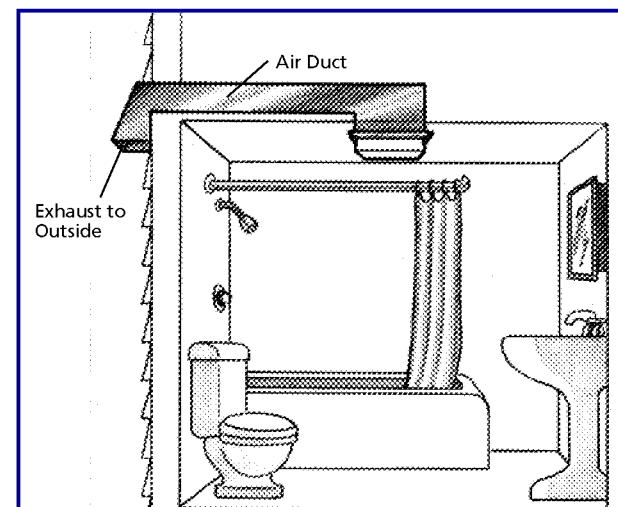
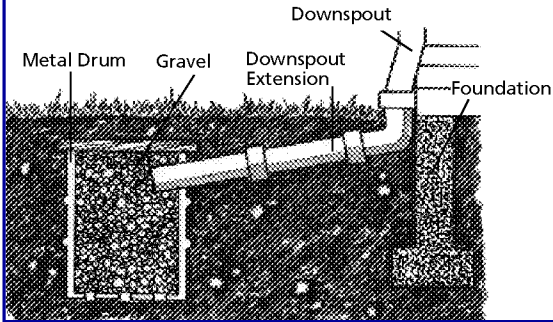


Fig. 2

A bathroom exhaust fan controls moisture levels.

**Fig. 3**

A typical drywell installation to keep water out of a basement.



### Use Dehumidifiers and Air Conditioners.

Especially in hot, humid climates, to reduce moisture in the air. Be sure to maintain and clean these appliances so they do not become contributors of pollutants.

**Correct Basement Problems.** Minimize biological pollutants in basements by fixing leaks and seepage in the foundation. If water is entering your house from the outside, your options range from simple landscaping to extensive excavation and waterproofing. The ground must slope away from the house.

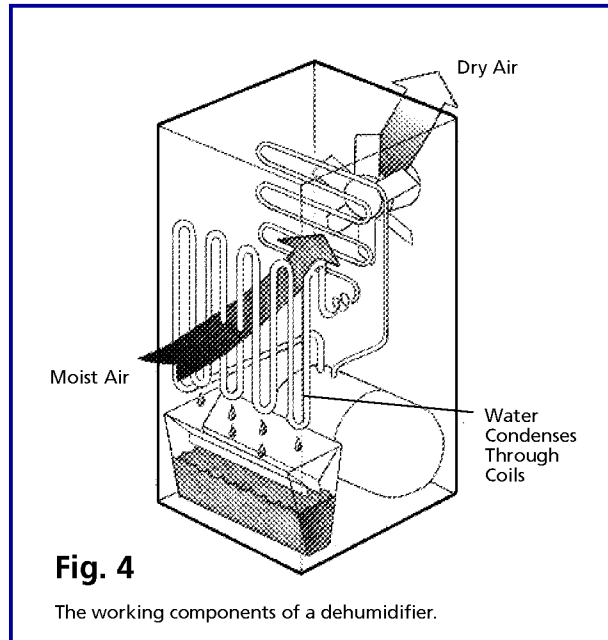
Use gutters and downspouts to divert rainwater away from the house. Well-constructed drywells are a good way to dispose of water from the downspouts (**Fig. 3**).

Clean and disinfect the basement floor drain regularly. Don't finish a subsurface basement unless all water leaks are patched and outdoor ventilation and adequate heat to prevent condensation are provided. Operate a dehumidifier in the basement if needed to keep relative humidity levels between 30 and 50 percent (**Fig. 4**). See How-To Booklet #3048 for other suggestions to keep your basement dry.

**Protect Crawlspace.** Put a plastic cover over dirt in crawlspaces to prevent moisture from coming in from the ground. Be sure crawlspaces are well ventilated.

**Install Carpet Correctly.** Pay special attention to carpet on concrete floors. Carpet can absorb moisture and serve as a place for biological pollutants to grow. Use area rugs that can be taken up and washed often. In certain climates, if carpet is to be installed over a concrete floor, it may be necessary to use a vapor barrier of plastic sheeting over the concrete. Cover the plastic with a subflooring to prevent moisture problems.

**Correct Water Damage.** To correct water damage, thoroughly dry and clean water-damaged carpets and building materials within 24 hours if possible. Water damaged carpets and building materials can harbor mold and bacteria. If health problems persist after you have tried to dry these materials, replace them. If absorbent materials are water damaged by a flood, discard them. Flood water is considered septic due to flooded sewage treatment plants. Correct water leaks in pipes or around tubs and sinks. These can provide a place for biological pollutants to grow. Search out and repair any persistent structural leaks.

**Fig. 4**

The working components of a dehumidifier.

**Prevent Condensation.** Raise the temperature of cold surfaces where moisture condenses. Use insulation or storm windows. A storm window installed on the inside works better than one installed on the outside. Increase air circulation by opening doors between rooms, especially doors to closets as they may be colder than the rooms. Circulation carries heat to the cold surfaces. Use fans and move furniture from wall corners to further promote air and heat circulation. Be sure your house has a source of fresh air and can expel excessive moisture.

**Keep the House Clean.** Clean moist surfaces, such as showers and kitchen counters. Remove mold from walls, ceilings, floors, and paneling. Do not simply cover mold with paint, stain, varnish, or a moisture-proof sealer. It may resurface. Replace moldy shower curtains, or remove them and scrub well with a household cleaner and rinse before rehanging them.

**Know Your Region.** Moisture problems and their solutions differ from one climate to another. The Northeast is cold and wet; the Southwest is hot and dry; the South is hot and wet, and the western mountain states are cold and dry. All of these regions can have moisture problems. For example, evaporative coolers used in the Southwest can encourage the growth of biological pollutants. In other hot regions, the use of air conditioners that cool the air too quickly may prevent the air conditioners from running long enough to remove excess moisture from the air. The types of construction and weatherization for the different climates can lead to different problems and solutions.

## HOME HUMIDIFIERS

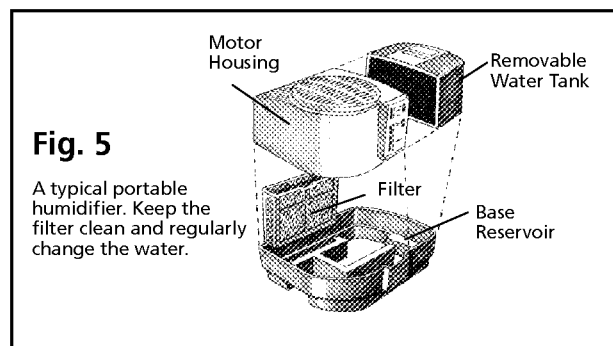
Humidifiers are used in homes to add moisture—which relieves the discomforts of dry nose, throat, lips, and skin. The moisture they add to dry air also helps alleviate common nuisances brought on by winter heating, such as static electricity, peeling wallpaper, and cracks in paint and furniture. If not properly cared for, the inside of humidifiers can

become active breeding grounds for unhealthy microorganisms, which are then blown into the room air. They can also disperse some minerals that could have a health effect on those with lung diseases or respiratory allergies.

Potential health effects resulting from the dispersal of microorganisms and minerals by home humidifiers are not fully understood. Regardless, reduce your potential for exposure to these materials by taking the following precautions, particularly when using ultrasonic- and impeller-type humidifiers (**Fig. 5**).

**Care for Your Humidifier.** Always unplug the unit before servicing. Empty the tank, wipe all surfaces dry, and refill the water in portable humidifiers daily. This will reduce the growth of microorganisms. Follow the manufacturer's instructions for changing water in console humidifiers.

Clean portable humidifiers every third day. Empty the tank and use a brush or other scrubber to clean it. Remove scale, deposits, and film that have formed on the sides of the tank or on interior surfaces, and wipe all surfaces dry. Follow the manufacturer's suggestions on the use of cleaning products or disinfectants. In the absence of specific recommendations, clean all surfaces coming in contact with water with a 3 percent solution of hydrogen peroxide. If you use any cleaning or disinfecting agent, rinse the tank thoroughly with several changes of tap water to prevent dispersal of chemicals into the air during use.



**Watch the Water.** Use water with low mineral content to prevent the build-up of scale and the dispersal of minerals into the air. In areas of the country where the mineral content in the tap water is high, using distilled water may be less expensive than cartridges, cassettes, or filters. Tests done by the Environmental Protection Agency (EPA) show that steam vaporizers and evaporative humidifiers don't disperse substantial amounts of minerals into the air. Where private well water is used to fill the humidifier, use an ultraviolet light filtration system to kill organisms in the water.

### WATER APPLIANCES

Maintain and clean all appliances that come in contact with water. Have regular cleanings and inspections performed by a professional for major appliances such as furnaces, heat pumps, washing machines, and central air conditioners. Remember to clean before seasonal use.

Change filters on heating and cooling systems according to manufacturer's directions. (In general, change filters monthly during use.) When first turning on the heating or air-conditioning at the start of the season, consider leaving your home until it airs out.

If you use window or wall air conditioning units, have them cleaned and serviced regularly by a professional, especially before the cooling season. Air conditioners can help reduce the entry of allergy-causing pollen, but they may also become a source of biological pollutants if not properly maintained. Clean the coils and incline the drain pans according to manufacturer's instructions, so water cannot collect in pools.

Have furnace-attached humidifiers cleaned and serviced regularly by a professional, especially before the heating season. Evaporator trays in dehumidifiers and refrigerator drip pans should also be cleaned frequently. If refrigerator and freezer doors don't seal properly, moisture may build up and mold can grow. Remove any mold on door gaskets and replace faulty gaskets.

### DUST CONTROL

Controlling dust is very important for people who are allergic to animal dander, pollens, and mites. You cannot see mites, but you can either remove their favorite breeding grounds or keep these areas dry and clean. Dust mites thrive in sofas, stuffed chairs, carpets, and bedding. Open shelving, fabric wallpaper, and window blinds are also favorite spots for dust mites. Dust mites live deep in the carpet and are not removed by vacuuming. Many doctors suggest that their mite-allergic patients use washable area rugs rather than wall-to-wall carpet. Other suggestions to keep dust under control are:

- 🏠 Always wash bedding in hot water (at least 130 degrees F) to kill dust mites. Cold water won't do the job. Launder bedding at least every seven to ten days.
- 🏠 Use synthetic or foam rubber mattress pads and pillows, and plastic mattress covers if you are allergic. Do not use fuzzy wool blankets, feather- or wool-stuffed comforters, or feather pillows.
- 🏠 Clean rooms and closets well. Dust and vacuum often to remove surface dust. Vacuuming and other cleaning may not remove all animal dander, dust mite material, and other biological pollutants. Some particles are so small they pass through vacuum bags and remain in the air. If you are allergic to dust, wear a mask when vacuuming or dusting. Or use new vacuum cleaners with a high efficiency particulate air (HEPA) filter or water filter. (Remember the water vacuums can have biological pollutants growing in them.) People who are highly allergy-prone should not perform these tasks. They may even need to leave the house when someone else is cleaning.

The Assistance of Green Seal, Washington, DC; The Healthy House Institute, Bloomington, IN; and Linda Mason Hunter, Healthy Home Designs, Des Moines, IA, is gratefully acknowledged in reviewing the information in this booklet.