



**A BRIEF GUIDE TO**  
**MOLD,**  
**MOISTURE,**  
**AND**  
**YOUR HOME**

Indoor Air Quality (IAQ)

**This Guide provides  
information and guidance  
for homeowners and  
renters on how to clean  
up residential mold  
problems and how to  
prevent mold growth.**

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# A BRIEF GUIDE TO MOLD, MOISTURE, AND YOUR HOME

<b>Contents</b>	<b>Page</b>
<b>Mold Basics</b>	
Why is mold growing in my home?	2
Can mold cause health problems?	2
How do I get rid of mold?	3
<b>Mold Cleanup</b>	
Who should do the cleanup?	4
<b>Mold Cleanup Guidelines</b>	6
<b>What to Wear When Cleaning Moldy Areas</b>	8
<b>How Do I Know When the Remediation     or Cleanup is Finished?</b>	9
<b>Moisture and Mold Prevention and Control Tips</b>	10
Actions that will help to reduce humidity	11
Actions that will help prevent condensation	12
Testing or sampling for mold	13
<b>Hidden Mold</b>	14
<b>Cleanup and Biocides</b>	15
<b>Additional Resources</b>	16



# MOLD BASICS

- The key to mold control is moisture control.
- If mold is a problem in your home, you should clean up the mold promptly *and* fix the water problem.
- It is important to dry water-damaged areas and items within 24-48 hours to prevent mold growth.



## Why is mold growing in my home?



*Mold growing outdoors on firewood. Molds come in many colors; both white and black molds are shown here.*

Molds are part of the natural environment. Outdoors, molds play a part in nature by breaking down dead organic matter such as fallen leaves and dead trees, but indoors, mold growth should be avoided. Molds reproduce by means of tiny spores; the spores are invisible to the naked eye and float through outdoor and indoor air. Mold may begin growing indoors when mold spores land on surfaces that are wet. There are many types of mold, and none of them will grow without water or moisture.

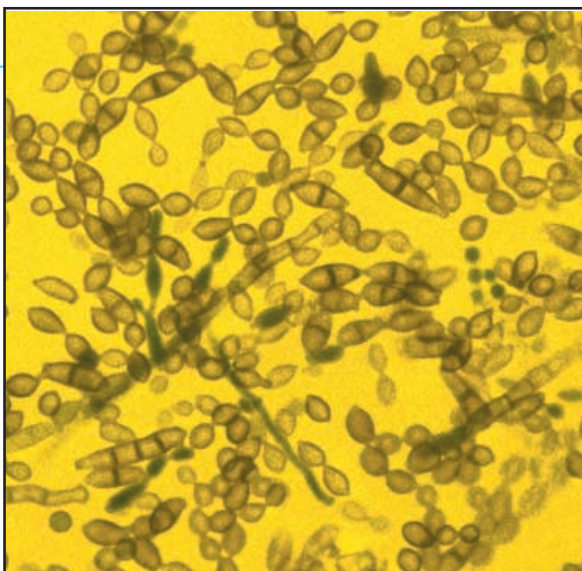
**Can mold cause health problems?** Molds are usually not a problem indoors, unless mold spores land on a wet or damp spot and begin growing. Molds have the potential to cause health problems. Molds produce allergens (substances that can cause allergic reactions), irritants, and in some cases, potentially toxic substances (mycotoxins).

Inhaling or touching mold or mold spores may cause allergic reactions in sensitive individuals. Allergic responses include hay fever-type symptoms, such as sneezing, runny nose, red eyes, and skin rash (dermatitis). Allergic reactions to mold are common. They can be immediate or delayed. Molds can also cause asthma attacks in people with asthma who are allergic to mold. In addition, mold exposure can irritate the eyes, skin, nose, throat, and lungs of both mold-

allergic and non-allergic people. Symptoms other than the allergic and irritant types are not commonly reported as a result of inhaling mold.

Research on mold and health effects is ongoing. This brochure provides a brief overview; it does not describe all potential health effects related to mold exposure. For more detailed information consult a health professional. You may also wish to consult your state or local health department.

**How do I get rid of mold?** It is impossible to get rid of all mold and mold spores indoors; some mold spores will be found floating through the air and in house dust. The mold spores will not grow if moisture is not present. Indoor mold growth can and should be prevented or controlled by controlling moisture indoors. If there is mold growth in your home, you must clean up the mold **and** fix the water problem. If you clean up the mold, but don't fix the water problem, then, most likely, the mold problem will come back.



*Magnified mold spores.*

**Molds can gradually destroy the things they grow on. You can prevent damage to your home and furnishings, save money, and avoid potential health problems by controlling moisture and eliminating mold growth.**

# MOLD

## CLEANUP



*Leaky window – mold is beginning to rot the wooden frame and windowsill.*

If you already have a mold problem –  
**ACT QUICKLY.**  
Mold damages what it grows on. The longer it grows, the more damage it can cause.

**Who should do the cleanup?** Who should do the cleanup depends on a number of factors. One consideration is the size of the mold problem. If the moldy area is less than about 10 square feet (less than roughly a 3 ft. by 3 ft. patch), in most cases, you can handle the job yourself, following the guidelines below. However:

- If there has been a lot of water damage, and/or mold growth covers more than 10 square feet, consult the U.S. Environmental Protection Agency (EPA) guide: *Mold Remediation in Schools and Commercial Buildings*. Although focused on schools and commercial

buildings, this document is applicable to other building types. It is available on the Internet at: [www.epa.gov/mold](http://www.epa.gov/mold).

- If you choose to hire a contractor (or other professional service provider) to do the cleanup, make sure the contractor has experience cleaning up mold. Check references and ask the contractor to follow the recommendations in EPA's *Mold Remediation in Schools and Commercial Buildings*, the guidelines of the American Conference of Governmental Industrial Hygienists (ACGIH), or other guidelines from professional or government organizations.
- If you suspect that the heating/ventilation/air conditioning (HVAC) system may be contaminated with mold (it is part of an identified moisture problem, for instance, or there is mold near the intake to the system), consult EPA's guide *Should You Have the Air Ducts in Your Home Cleaned?* before taking further action. Do not run the HVAC system if you know or suspect that it is contaminated with mold - it could spread mold throughout the building. Visit [www.epa.gov/iaq/pubs](http://www.epa.gov/iaq/pubs) to download a copy of the EPA guide.
- If the water and/or mold damage was caused by sewage or other contaminated water, then call in a professional who has experience cleaning and fixing buildings damaged by contaminated water.
- If you have health concerns, consult a health professional before starting cleanup.



# MOLD **CLEANUP** GUIDELINES

## BATHROOM TIP

Places that are often or always damp can be hard to maintain completely free of mold. If there's some mold in the shower or elsewhere in the bathroom that seems to reappear, increasing the ventilation (running a fan or opening a window) and cleaning more frequently will usually prevent mold from recurring, or at least keep the mold to a minimum.



**Tips and techniques** The tips and techniques presented in this section will help you clean up your mold problem. Professional cleaners or remediators may use methods not covered in this publication. Please note that mold may cause staining and cosmetic damage. It may not be possible to clean an item so that its original appearance is restored.

- Fix plumbing leaks and other water problems as soon as possible. Dry all items completely.
- Scrub mold off hard surfaces with detergent and water, and dry completely.

*Mold growing on the underside of a plastic lawnchair in an area where rainwater drips through and deposits organic material.*





*Mold growing on a piece of ceiling tile.*



- Absorbent or porous materials, such as ceiling tiles and carpet, may have to be thrown away if they become moldy. Mold can grow on or fill in the empty spaces and crevices of porous materials, so the mold may be difficult or impossible to remove completely.
- Avoid exposing yourself or others to mold (see discussions: **What to Wear When Cleaning Moldy Areas** and **Hidden Mold**.)
- Do not paint or caulk moldy surfaces. Clean up the mold and dry the surfaces before painting. Paint applied over moldy surfaces is likely to peel.
- If you are unsure about how to clean an item, or if the item is expensive or of sentimental value, you may wish to consult a specialist. Specialists in furniture repair, restoration, painting, art restoration and conservation, carpet and rug cleaning, water damage, and fire or water restoration are commonly listed in phone books. Be sure to ask for and check references. Look for specialists who are affiliated with professional organizations.

# WHAT TO WEAR WHEN CLEANING MOLDY AREAS



*Mold growing on a suitcase stored in a humid basement.*

It is important  
to take  
precautions to  
**LIMIT  
YOUR  
EXPOSURE**  
to mold and  
mold spores.

- **Avoid breathing in mold or mold spores.** In order to limit your exposure to airborne mold, you may want to wear an N-95 respirator, available at many hardware stores and from companies that advertise on the Internet. (They cost about \$12 to \$25.) Some N-95 respirators resemble a paper dust mask with a nozzle on the front, others are made primarily of plastic or rubber and have removable cartridges that trap most of the mold spores from entering. In order to be effective, the respirator or mask must fit properly, so carefully follow the instructions supplied with the respirator. Please note that the Occupational Safety and Health Administration (OSHA) requires that respirators fit properly (fit testing) when used in an occupational setting; consult OSHA for more information (800-321-OSHA or [osha.gov/](http://osha.gov/)).

- **Wear gloves.** Long gloves that extend to the middle of the forearm are recommended. When working with water and a mild detergent, ordinary household rubber gloves may be used. If you are using a disinfectant, a biocide such as chlorine bleach, or a strong cleaning solution, you should select gloves made from natural rubber, neoprene, nitrile, polyurethane, or PVC (see **Cleanup and Biocides**). Avoid touching mold or moldy items with your bare hands.

- **Wear goggles.** Goggles that do not have ventilation holes are recommended. Avoid getting mold or mold spores in your eyes.



*Cleaning while wearing N-95 respirator, gloves, and goggles.*

## **How do I know when the remediation or cleanup is finished?**

You must have completely fixed the water or moisture problem before the cleanup or remediation can be considered finished.

- You should have completed mold removal. Visible mold and moldy odors should not be present. Please note that mold may cause staining and cosmetic damage.
- You should have revisited the site(s) shortly after cleanup and it should show no signs of water damage or mold growth.
- People should have been able to occupy or re-occupy the area without health complaints or physical symptoms.
- Ultimately, this is a judgment call; there is no easy answer.



# MOISTURE AND MOLD **PREVENTION** AND CONTROL TIPS

## MOISTURE Control is the Key to **Mold Control**



*Mold growing  
on the surface  
of a unit  
ventilator.*

- When water leaks or spills occur indoors - **ACT QUICKLY.** If wet or damp materials or areas are dried 24-48 hours after a leak or spill happens, in most cases mold will not grow.
- Clean and repair roof gutters regularly.
- Make sure the ground slopes away from the building foundation, so that water does not enter or collect around the foundation.
- Keep air conditioning drip pans clean and the drain lines unobstructed and flowing properly.



*Condensation on the inside of a window-pane.*

■ Keep indoor humidity low. If possible, keep indoor humidity below 60 percent (ideally between 30 and 50 percent) relative humidity. Relative humidity can be measured with a moisture or humidity meter, a small, inexpensive (\$10-\$50) instrument available at many hardware stores.

■ If you see condensation or moisture collecting on windows, walls or pipes - ACT QUICKLY to dry the wet surface and reduce the moisture/water source. Condensation can be a sign of high humidity.

#### **Actions that will help to reduce humidity:**

- 💧 Vent appliances that produce moisture, such as clothes dryers, stoves, and kerosene heaters to the outside where possible. (Combustion appliances such as stoves and kerosene heaters produce water vapor and will increase the humidity unless vented to the outside.)
- 💧 Use air conditioners and/or de-humidifiers when needed.
- 💧 Run the bathroom fan or open the window when showering. Use exhaust fans or open windows whenever cooking, running the dishwasher or dishwashing, etc.

## Actions that will help prevent condensation:

- 💧 Reduce the humidity (see preceeding page).
- 💧 Increase ventilation or air movement by opening doors and/or windows, when practical. Use fans as needed.
- 💧 Cover cold surfaces, such as cold water pipes, with insulation.
- 💧 Increase air temperature.

*Mold growing on a wooden headboard in a room with high humidity.*





**Renters:** Report all plumbing leaks and moisture problems immediately to your building owner, manager, or superintendent. In cases where persistent water problems are not addressed, you may want to contact local, state, or federal health or housing authorities.



*Rust is an indicator that condensation occurs on this drainpipe. The pipe should be insulated to prevent condensation.*

### **Testing or sampling for mold**

Is sampling for mold needed? **In most cases, if visible mold growth is present, sampling is unnecessary.** Since no EPA or other federal limits have been set for mold or mold spores, sampling cannot be used to check a building's compliance with federal mold standards. Surface sampling may be useful to determine if an area has been

adequately cleaned or remediated. Sampling for mold should be conducted by professionals who have specific experience in designing mold sampling protocols, sampling methods, and interpreting results. Sample analysis should follow analytical methods recommended by the American Industrial Hygiene Association (AIHA), the American Conference of Governmental Industrial Hygienists (ACGIH), or other professional organizations.

# HIDDEN MOLD

*Mold growing on the back side of wallpaper.*



**Suspicion of hidden mold** You may suspect hidden mold if a building smells moldy, but you cannot see the source, or if you know there has been water damage and residents are reporting health problems. Mold may be hidden in places such as the back side of dry wall, wallpaper, or paneling, the top side of ceiling tiles, the underside of carpets and pads, etc. Other possible locations of hidden mold include areas inside walls around pipes (with leaking or condensing pipes), the surface of walls behind furniture (where condensation forms), inside ductwork, and in roof materials above ceiling tiles (due to roof leaks or insufficient insulation).

**Investigating hidden mold problems** Investigating hidden mold problems may be difficult and will require caution when the investigation involves disturbing potential sites of mold growth. For example, removal of wallpaper can lead to a massive release of spores if there is mold growing on the underside of the paper. If you believe that you may have a hidden mold problem, consider hiring an experienced professional.

**Cleanup and Biocides** Biocides are substances that can destroy living organisms. The use of a chemical or biocide that kills organisms such as mold (chlorine bleach, for example) is not recommended as a routine practice during mold cleanup. There may be instances, however, when professional judgment may indicate its use (for example, when immune-compromised individuals are present). In most cases, it is not possible or desirable to sterilize an area; a background level of mold spores will remain - these spores will not grow if the moisture problem has been resolved. If you choose to use disinfectants or biocides, always ventilate the area and exhaust the air to the outdoors. Never mix chlorine bleach solution with other cleaning solutions or detergents that contain ammonia because toxic fumes could be produced.

**Please note:** Dead mold may still cause allergic reactions in some people, so it is not enough to simply kill the mold, it must also be removed.

*Water stain on a basement wall — locate and fix the source of the water promptly.*





# ADDITIONAL **RESOURCES**

For more information on mold related issues including mold cleanup and moisture control/condensation/humidity issues, visit:

**[www.epa.gov/mold](http://www.epa.gov/mold)**



*Mold growing on fallen leaves.*

*This document is available on the Environmental Protection Agency, Indoor Environments Division website at: [www.epa.gov/mold](http://www.epa.gov/mold)*

# NOTES

## Acknowledgements

EPA would like to thank Paul Ellringer, PE, CIH, for providing the photo on page 14.

Please note that this document presents recommendations. EPA does not regulate mold or mold spores in indoor air.





# MOLD AND MILDEW ADDENDUM

Mold and mildew spores are present in the environment, both indoors and outdoors, and cannot be eliminated. Excess moisture is the leading cause of mold or mildew growth indoors. Most sources of moisture, however can be controlled by simple procedures under the occupants control.

The Tenants are responsible for all damage resulting from their failure to comply with this addendum.

In order to reduce and minimize the prospect of mold and mildew and to protect your health and the condition of the rental, please utilize the following list of suggestions.

1. Provide adequate ventilation and keep the temperature down.

- Keep the temperature between 50 and 70 degrees at all times
- Open multiple windows to all for cross-ventilation at least twice a week for on hour each time
- Allow at least one inch between the furniture and walls to aid ventilation
- Open closet doors to allow ventilation

2. Keep the humidity below 40%.

- Use the bathroom fan during and for 30 minutes after bathing or showering.  
If no fan is available open the bathroom window slightly for the same duration of time
- Use the fan in the laundry area during and for 20 minutes after using the washer or dryer.  
If no fan is available, open a window slightly for ventilation during the use of the appliances and for a little while after use as deemed appropriate
- Use the fan above the stove whenever cooking, especially if steaming.  
If no fan is available open a window slightly
- Use only electric space heaters indoors
- Use a dehumidifier during humid months as applicable
- Cover fish tanks
- Do not keep excess number of house plants

3. Clean thoroughly and regularly.

- The following is the cleaning method recommended by the EPA:  
Mold growth can be removed with commercial cleaning products or a weak bleach solution ( one cup bleach in one gallon water). Wear gloves during cleanup and be careful not to spread the mold. Sensitive people who have to cleanup mold should wear a tight fitting face mask
- Use mold killing products when cleaning kitchens and bathrooms
- If mold or mildew appears on walls, ceilings, floors or around tubs or sinks, immediately remove the mold or mildew
- Dry any water that spills from showers, tubs or sinks immediately
- Clean up spills onto carpets, rugs or floors and thoroughly dry the rug or carpet
- Regularly check and clean the window tracks and keep free of condensation

4. You are obligated to notify the Owner/Agent immediately of excess moisture problems such as water leakage, leaking plumbing, leaking tubs or showers or running toilets. If you have attempted to clean mold or mildew and it reappears quickly or you are not able to remove it, report the problem to the Owner/Agent immediately.

Should you need additional information on mold, please see the State of Washington Division of Environmental Health web site: <http://www.doh.wa.gov/ehp> or contact Tim Hardin of the Washington State Department of Health at (360) 236-3363 or [tim.hardin@doh.wa.gov](mailto:tim.hardin@doh.wa.gov).

Initial Tenant \_\_\_\_\_

Initial Owner/Agent \_\_\_\_\_

## Frequently Asked Questions About Mold

### What are molds?

With more than 100,000 species in the world, it is no wonder molds can be found everywhere. Neither animal or plant, molds are microscopic organisms that produce enzymes to digest organic matter and spores to reproduce. These organisms are part of the fungi kingdom, a realm shared with mushrooms, yeast, and mildews. In nature, mold plays a key role in the decomposition of leaves, wood, and other plant debris. Without mold, we would find ourselves wading neck-deep in dead plant matter. And we wouldn't have great foods and medicines, such as cheese and penicillin. However, problems arise when mold starts digesting organic materials we don't want them to, like our homes.

### How do molds grow in my home?

Once mold spores settle in your home, they need moisture to begin growing and digesting whatever they are growing on. There are molds that can grow on wood, ceiling tiles, wallpaper, paints, carpet, sheet rock, and insulation. When excess moisture or water builds up in your home from say, a leaky roof, high humidity, or flooding, conditions are often ideal for molds. Longstanding moisture or high humidity conditions and mold growth go together. Realistically, there is no way to rid all mold and mold spores from your home; the way to control mold growth is to control moisture.

### How can I be exposed to mold?

When molds are disturbed, their spores may be released into the air. You then can be exposed to the spores through the air you breathe. Also, if you directly handle moldy materials, you can be exposed to mold and mold spores through contact with your skin. Eating moldy foods or hand-to-mouth contact after handling moldy materials is yet another way you may be exposed.

### How can molds affect my health?

Generally, the majority of common molds are not a concern to someone who is healthy. However if you have allergies or asthma, you may be sensitive to molds. You may experience skin rash, running nose, eye irritation, cough, congestion, and aggravation of asthma. Also if you have an immune suppression or underlying lung disease, you may be at increased risk for infections from molds.

When necessary, some resourceful molds produce toxins in defense against other molds and bacteria called mycotoxins. Depending on exposure level, these mycotoxins may cause toxic effects in people, also. Fatigue, nausea, headaches, and respiratory and eye irritation are some symptoms that may be experienced from exposure to mycotoxins. If you or your family members have health problems that you suspect are caused by exposure to mold, you should consult with your physician.

### How do I know if I have a mold problem?

You may have seen white thread-like growths or clusters of small black specks along your damp bathroom or basement walls, or smelled a "musty" odor. Seeing and smelling mold is a good indication that you have a mold problem. However, you cannot always rely upon your senses to locate molds. Hidden mold can be growing behind wall coverings or ceiling tiles.

Common places to find mold are in areas where water has damaged building materials and furnishings perhaps from flooding or plumbing leaks. Mold can also be found growing along walls where warm moist air condenses on cooler wall surfaces, such as inside cold exterior walls, behind dressers, headboards, and in closets where articles are stored against walls. Rooms with both high water usage and humidity, such as kitchens, bathrooms, laundry rooms, and basements are often havens for mold. If you notice mold or know of water damaged areas in your home, it is time to take action to control its growth.

### How can I control mold growth in my home?

Fix any moisture problems in your home:

- Stop all water leaks first. Repair leaking roofs and plumbing fixtures. Move water away from concrete slabs and basement walls.

- Increase air circulation within your home, especially along the inside of exterior walls, and ventilate with fresh air from outside. Provide warm air to all areas of the home. Move large objects away from the inside of exterior walls just a few inches to provide good air circulation.
- Install and use exhaust fans in bathrooms, kitchens, and laundry rooms.
- Ventilate and insulate attic and crawl spaces. Cover earth floors in crawl spaces with heavy plastic.
- Clean and dry water damaged carpets, clothing, bedding, upholstered furniture within 24 to 48 hours, or consider removing and replacing damaged furnishings.
- Vacuum and clean your home regularly.

### How do I clean up mold?

The time you are most likely to stir up spores and be exposed is the very time you are trying to clean up your mold problem. That's when you need to be the most careful. First, try to determine the extent of the mold infestation. If the area is small and well defined, clean up can be done by you, as long as you are free of any health symptoms or allergies. However, if the mold problem is extensive, such as between the walls or under the floors, you should leave clean up to a professional.

The time you are most likely to stir up spores and be exposed is the very time you are trying to clean up your mold problem. That's when you need to be the most careful. First, try to determine the extent of the mold infestation. If the area is small and well defined, clean up can be done by you, as long as you are free of any health symptoms or allergies. However, if the mold problem is extensive, such as between the walls or under the floors, you should leave clean up to a professional.

<b>Large Areas</b>	<ol style="list-style-type: none"> <li>1. Consider having a professional cleanup the area. To find a professional, check under "Fire and Water Damage Restoration" in your Yellow Pages. If you decide to clean up on your own, follow the guidance below.</li> <li>2. Protect yourself by using goggles, gloves, and breathing protection while working in the area. For large consolidated areas of mold growth, you should use an OSHA (Occupational Safety &amp; Health Administration) approved particle mask.</li> <li>3. Seal off area from the rest of your home. Cover heat registers or ventilation ducts/grills. Open a window before you start to clean up.</li> <li>4. Remove all your furnishings to a neutral area to be cleaned later. Follow cleaning directions below.</li> <li>5. Bag all moldy materials you will be discarding.</li> <li>6. Scrub all affected hard surfaces: <ul style="list-style-type: none"> <li>• First with a mild detergent solution, such as laundry detergent and warm water.</li> <li>• (optional step) Then use a solution of ¼ cup bleach to one quart of water. Wait 20 minutes and repeat. Wait another 20 minutes.</li> <li>• Last, apply a borate-based detergent solution and do <b>not</b> rinse. This will help prevent mold from growing again. To find a borate-based detergent, read the ingredients listed on the package label for borates.</li> </ul> </li> <li>7. Give the entire area a good cleaning. Vacuum floors, and wash bedding and clothes if exposed.</li> </ol>
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### Small Areas

1. Protect yourself by using goggles, gloves, and breathing protection while working in the area. For small isolated areas of mold growth, a cotton dust mask should do.
2. Seal off area from the rest of your home. Cover heat registers or ventilation ducts/grills. Cover all your furniture. Open a window before you start clean up.
3. Bag all moldy materials, you will be discarding.
4. Scrub all affected hard surfaces:
  - First with a mild detergent solution, such as laundry detergent and warm water.
  - (optional step) Then use a solution of ¼ cup bleach to one quart of water. Wait 20 minutes and repeat. Wait another 20 minutes.
  - Last apply a borate-based detergent solution and do **not** rinse. This will help prevent mold from growing again. To find a borate-based detergent, read the ingredients listed on the package label for borates.
5. Give the entire area a good cleaning, vacuum floors, and wash bedding and clothes if exposed.

### Clean all furnishings exposed to mold.

<b>Permeable and washable</b>	Such as clothing, bedding, and other washable articles. Simply run through the laundry.
<b>Non-permeable and washable</b>	Such as wood, metal, plastic, glass, and ceramics. Mix a solution of lukewarm water and laundry detergent, and wipe down your articles.
<b>Permeable but not washable</b>	Such as beds and furniture. If these furnishings are moldy, you should consider discarding and replacing them. If you decide it is a keeper, take the furnishing outside. Give it a good vacuuming, and let it air out. When finished, if you do not notice an odor it should be okay. However, watch for any mold growth or health problems.