

## What Causes Odors in Paper?



Mold and Mildew: <http://www.moldtips.com/mold-vs-mildew-differences/>

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If you have ever walked through a library or flipped through old books at a used book store you have most likely experienced the ‘old book’ smell. This is the natural scent of aging materials that make up books, like paper, leather, and book cloth. This ‘nostalgic’ smell is inherently part of the objects, and if they are not exhibiting damages, they should be left alone. However, there are other tell-tale odors that can indicate a problem or may point to poor storage conditions.

Mildew and mold are the most common causes of bad odors emanating from books and paper-based items like documents, art, and maps. This

distinct, musty, and sometimes sweet smell indicates that items have either been in direct contact with water or have been stored in a location where moisture has caused the organic items to become a host for fungus. Mildew is often not visible on paper and books, although it typically looks like a white, spidery dust. Mold tends to appear in spots which can range greatly in size depending on severity. Mold can also vary in color from black to purple to green, depending on the mold species. Other common odors are the result of exposure to tobacco smoke and fireplaces. These odors tend to be acrid and sooty, much like an extinguished fire. Soot particles and nicotine can eas-

ily attach themselves to shelved books and works on paper that are hanging on walls. Even framed objects are eas-

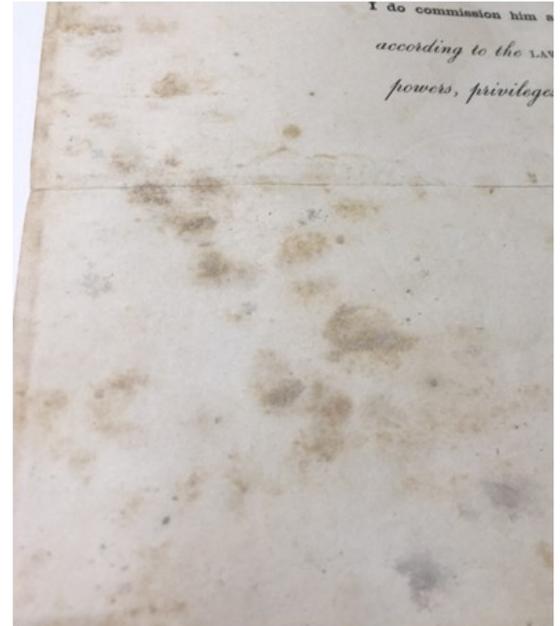
ily subjected to smoke particulates and mold or mildew growth.

## What Can Be Done to Minimize Odors?

### Storage

“Storing these items in basements or attics where fluctuations in temperature and relative humidity occur can create potential for mildew and mold growth.”

The easiest solution for minimizing odors is proper storage and display of paper-based items. This means storing important papers in polyester, polyethylene, or polypropylene sleeves and acid-free, lignin-free, alpha cellulose or rag folders; these should be placed in alpha cellulose boxes to protect them from atmospheric pollutants and to help buffer fluctuations in relative humidity. Fragile or valuable books can be stored in a variety of alpha cellulose matboard boxes (see *Caring for Books* and *Caring for Documents*). Books and paper should be stored in a living area of the house. Storing these items in basements or attics where fluctuations in temperature and relative humidity occur can create potential for mildew and mold growth. Unfortunately, this is



often where old family papers are kept; the damages can range from odors to irreversible mold staining and structural problems.

### Display

Valued works of art on paper or framed documents should not be displayed in rooms with working fireplaces, or areas exposed to regular tobacco use. If this is unavoidable, a

HEPA-filtration air purifier can be used to capture particulate matter in the air that is both harmful for people and paper. Filters must be changed regularly to be most effective.

## Reducing Odors at Home

If books smell musty they may be harboring mildew, or the paper has simply taken on moisture from the air. This is a common problem that can plague libraries, archives, historic homes, and private individuals. One solution is to air out the books, while reducing the relative humidity in the affected area or room.

*Procedure:* The offending books should be placed upright on a table and opened to an angle of about 60 degrees. A standard oscillating fan should be placed in front of the musty books. This helps to reduce moisture by ‘drying’ the books while also keeping the air circulating so

spores cannot easily settle. If possible, a dehumidifier should also be placed in the area to lower the relative humidity of the space. The fan should be allowed to run for a minimum of one day and can be used continually until the odor dissipates.



## Products that Absorb Odors

Using a product containing zeolites is another option for odor reduction. Zeolites are naturally occurring minerals that act as sponges to trap harmful degradation products and odors. They are used in many familiar products, including kitty litter. Some conservation materials like paper and board are impregnated with zeolites to buffer works of art and documents from harmful acids. If books are persistently smelly, sheets of MicroChamber® tissue (which contains zeolites) can be placed directly in between book pages to help remove some of the spores and particulate matter. While the tissue is thin, it will add considerable bulk to a book; if the book is thick, place tissue every five or ten pages. Thinner books or those with

more flexible bindings will accommodate more tissue. These sheets of tissue can be discarded and replaced as needed.



Pre-made boxes with MicroChamber® technology can also be purchased from conservation suppliers. These are called ArtCare® boxes. Papers and books can be stored in these boxes or in folders made from MicroChamber® paper, which will ultimately help to reduce

odors by reducing harmful degradation products in the objects. MicroChamber® boxes, and paper are available in various thicknesses to suit different needs.

Desiccants can also be used to buffer moisture in the air and in small spaces such as storage boxes. These small packets are often used in consumer goods like shoe boxes. Products like silica gel are effective and can be purchased from conservation suppliers, art supply stores, and even hardware stores. Be sure to follow manufacturer's guidelines for using these products.

Some of the less common causes of odors in paper-based materials include animal and pet smells and food odors. Be sure to consult a conservator when dealing with these types of unique



## What Should Not be Done to Minimize Odors

Many do-it-yourself home remedies for odor reduction can be found online. It is not recommended to use any of the following materials on your books or papers:

- Baking soda
- Kitty litter
- Cedar chips or potpourri
- Lysol or other aerosol sprays

Never apply household liquid cleaners of any kind to paper, books, or book covers made of leather or cloth as it can cause irreversible damage. The best step to preventing odors is proper storage and display of items. Consult a conservator if you are unsure when dealing with specific or stubborn odors.

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## Additional Resources

### Mold Information

Conservation Online. *Invasion of the Giant Mold Spore*. Retrieved from  
<http://cool.conservation-us.org/byauth/nyberg/spore.html>

Biblio.com. Identify. *Remove, and Prevent Mold and Mildew from Books*. Retrieved from  
<http://www.biblio.com/book-collecting/care-preservation/prevent-remove-mold-mildew/>

### Reducing Smells

Library of Congress. *Frequently Asked Questions*. Retrieved from <http://www.loc.gov/preservation/about/faqs/disaster.html>

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## Conservation Suppliers

### Conservation Resources International

5532 Port Royal Road  
Springfield, VA 22151  
Toll free: (800) 634-6932  
[www.conservationresources.com](http://www.conservationresources.com)  
*Archival housing/storage supplies, photographic supplies, general*

### Gaylord Archival

P. O. Box 4901  
Syracuse, NY 13221-4901  
Toll Free: (800) 448-6160  
[www.gaylord.com](http://www.gaylord.com)  
*General conservation supplies, housing supplies*

### Hollinger Metal Edge, Inc.

6340 Bandini Blvd  
Commerce, CA 90040  
Toll Free: (800)-862-2228  
[www.hollingermetaledge.com](http://www.hollingermetaledge.com)  
*Archival housing/storage supplies*

### Light Impressions

100 Carlson Road  
Rochester, NY 14610  
Toll Free: (800) 975-6429  
[www.lightimpressionsdirect.com](http://www.lightimpressionsdirect.com)  
*Photographic supplies, housing, matting and framing supplies*

### University Products

517 Main Street  
P. O. Box 101  
Holyoke, MA 01041  
Toll Free: (800) 628-1912  
[www.universityproducts.com](http://www.universityproducts.com)  
*General conservation supplies, housing and matting supplies*

### Talas

330 Morgan Ave  
Brooklyn, NY 11211  
Telephone: (212) 219-0770  
[www.talasonline.com](http://www.talasonline.com)  
*Conservation supplies, photographic supplies, general*

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