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## NF94-138 Preservation of Paper Items

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## Preservation of Paper Items

*Shirley Niemeyer, Extension Specialist, Home Environment*

Everyday things such as paper clips, candle wax, oil, adhesive tape, mold, pollution and people can be harmful to paper items. Light, high temperatures, extremes in relative humidity, and pollutants increase the rate of paper deterioration. Extremely high or low humidity levels, heat and light cause rapid oxidation of paper, deterioration of the cellulose, brittleness, and fading of inks and color.

Paper varies in quality from flimsy, short-lived newsprint to durable ledger papers suited for storage and archives. Most modern book papers, for example, will last less than 50 years. Care and preservation can extend their use.

### **Light.**

Sunlight, incandescent and fluorescent light are sources of ultraviolet (UV) radiation. The UV rays in sunlight and fluorescent light can cause rapid fading in colors and inks and brittleness. Any strong light source may cause paper to fade, even if the light has been filtered with UV shields. However, very low light levels plus high humidity can result in mold growth.

Several months of exposure to even very low light levels may have the same effects on paper as a few days of direct sunlight. Damage by light is not reversible.

Storing book collections and other paper items in the dark may not be practical. Suitable precautions may include storage out of direct sunlight, use of special UV filtering shields on windows and lights, and use of heavy draperies. Valuable papers, such as old deeds, diplomas, etc. can be kept in acid-free file folders in low light areas.

Competent framers can mount and mat valuable documents with acid-free boards. Plastic ultraviolet filtering materials available from some plastics suppliers (e.g. UF-3 Plexiglas or Acrylite OP-2) will help to filter out the UV light. However, it should not directly touch the paper item framed.

### **Moisture.**

Storage areas should have adequate ventilation and less than 55 percent relative humidity (RH). A

steady RH between 45 to 60 percent is acceptable for papers. Mold growth is likely to occur when the RH level is over 65 percent. Too low an RH level can cause drying out and brittleness.

If mold is present on dry paper, brush off the mold with a soft brush (camel's hair brush, etc.) except on chalk drawings. Then expose the paper to an hour of sunlight or UV and circulating air to kill or reduce mold.

### **Pests.**

To reduce insect pests, use paradichlorobenzene moth crystals.

Replenish crystals in containers as needed. Moth crystals are toxic and should be out of reach of children and animals, and are not suggested for long-term or continuous use.

### **Temperature.**

Ideally the temperature recommended should be between 60 to 70 degrees F. Cooler temperatures, however will retard paper deterioration. Avoid extreme temperature fluctuations. Air that is too dry and too warm can cause brittleness and cracking.

Books should not be stored in the attic where temperatures may reach 100 to 150 degrees F.

## **Damaged Paper Items**

### **Water Soaked Paper.**

A paper conservator or museum curator may be able to assist in preservation of valued water soaked paper items. If you are unable to get assistance immediately, freeze the soaked papers to prevent rapid deterioration. This reduces the chance of mold growth. Place sheets of waxed paper between the pages before freezing. This will give you time to get advice from an expert before defrosting the papers.

Another method is to dry wet paper items between layers of clean white blotters or place the wet paper on top of the blotters to air-dry. Do not weight down. Avoid ironing wet paper. To avoid mold, keep the papers away from warmth as they air dry. Check frequently for signs of mildew or mold.

### **Soil.**

Dirt and soot can cause surface damage and spots. Erasing powder such as Opaline or Scum-X may remove fresh dirt and soot from the paper. Test first. Use only in blank parts of the paper item. Pour erasing powder directly on the paper in small areas and gently rub with a soft brush. Brush away residue. Kneaded or artist's soft vinyl erasers may be used to remove dirt or smudges in blank areas of the paper. Paper tears easily — work carefully and slowly.

Erasing powders, and artist's soft vinyl or kneading erasers are sold by art, stationary and architectural supply stores.

### **Adhesives and Tapes.**

Most pastes and glues are acidic and cause damage to paper, and stains. The residue of the adhesive from pressure-sensitive tapes remains on the paper after the tapes have fallen off. There is usually no

remedy for the dark brown stain resulting. Although paper conservators may be able to remove the stain, it is difficult. A hair dryer can be used first to warm the tape or adhesive. Then very gently scrape off or clean the adhesive with a vinyl eraser.

### **Creases and Tears.**

Store paper keepsakes (certificates, etc.) flat if possible in acid-free boxes to avoid creases and tears. Paper should be matted or layered with acid-free board or paper.

If the paper item has been folded, or rolled too long and you unroll it, damage may result from cracking, etc. To prevent this from happening place the paper in a humidity chamber. Test first to avoid damage to item.

Make your own chamber by using a fairly airtight box. Place a separate tray with 1/2 inch of water in it at the bottom of the box. Fit a fiberglass screen above or across the top of the tray. The screen should be far enough above the water tray to prevent contact with the water or accidental splashes. Lay the paper that has been folded or rolled onto the fiberglass screen. Close the box. When the paper is limp and flat, less than half a day, remove it and place between white tissue and white blotter paper. Weight with a piece of glass. Do not iron.

If only a small portion is creased, apply with a brush a solution of half water and half alcohol to the fold line or crease. Test first for damage. Flatten the spot with tissue or blotter paper and a flat glass.

Paper conservators mend tears with a patch of thin Japanese tissue and a neutral or slightly alkaline paste or adhesive. "Dry" wheat starch paste or rice starch are used carefully. Ordinary cornstarch paste made at home can be used. However items mended require pressing with weight until dry to avoid bubbles, etc. Pressure sensitive tapes, dry mount tissue, rubber cement and other adhesives may cause staining of the paper.

### **Display.**

Acid-free and buffered cardboard or all-rag board should be used to mat or mount valuable keepsakes. Ordinary mat board and cardboard are acidic and will, in time, transfer the chemicals to the paper mounted on it. The result is stains and possible disintegration.

Seal the back of framed items to prevent dust and pollutants from entering. Avoid mounting a print, watercolor or drawing directly against the glass or plastic as condensation may occur. Use a mat or strip to separate glass and paper.

### **Storage.**

Books should be upright on shelves and loose enough to be easily removed without damage to the cover.

All paper storage should be well ventilated. Clean and check often for mildew and mold growth, insects and rodents, and water leakage from pipes and walls. Avoid storing paper items against outer walls as the greatest variation of temperature and humidity occurs there.

Unless a basement is waterproof and has a relative humidity level of less than 55 percent, it should not be used for storage of valuable items.

Paper items can be encapsulated in polyester film. Encapsulation encloses the paper in an envelope between two sheets of transparent polyester film (e.g. Mylar). The edges are closed with a special double coated tape (e.g. 3M No. 415). The tape should not touch the paper. Precut, taped kits are available from conservation supply houses. Encapsulation protects items for handling. Lamination is not reversible and should be avoided to prevent permanent damage.

Special problems and questions regarding valuable paper documents may be directed to the Assistant Director for Preservation, Administration Department, Library of Congress, Washington, DC 20540. Local libraries, museums, or the Nebraska State Historical Society in Lincoln, Nebraska may be of help.

Trade names used in this publication are for information only and do not imply endorsement of products named nor criticism of similar products not mentioned.

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