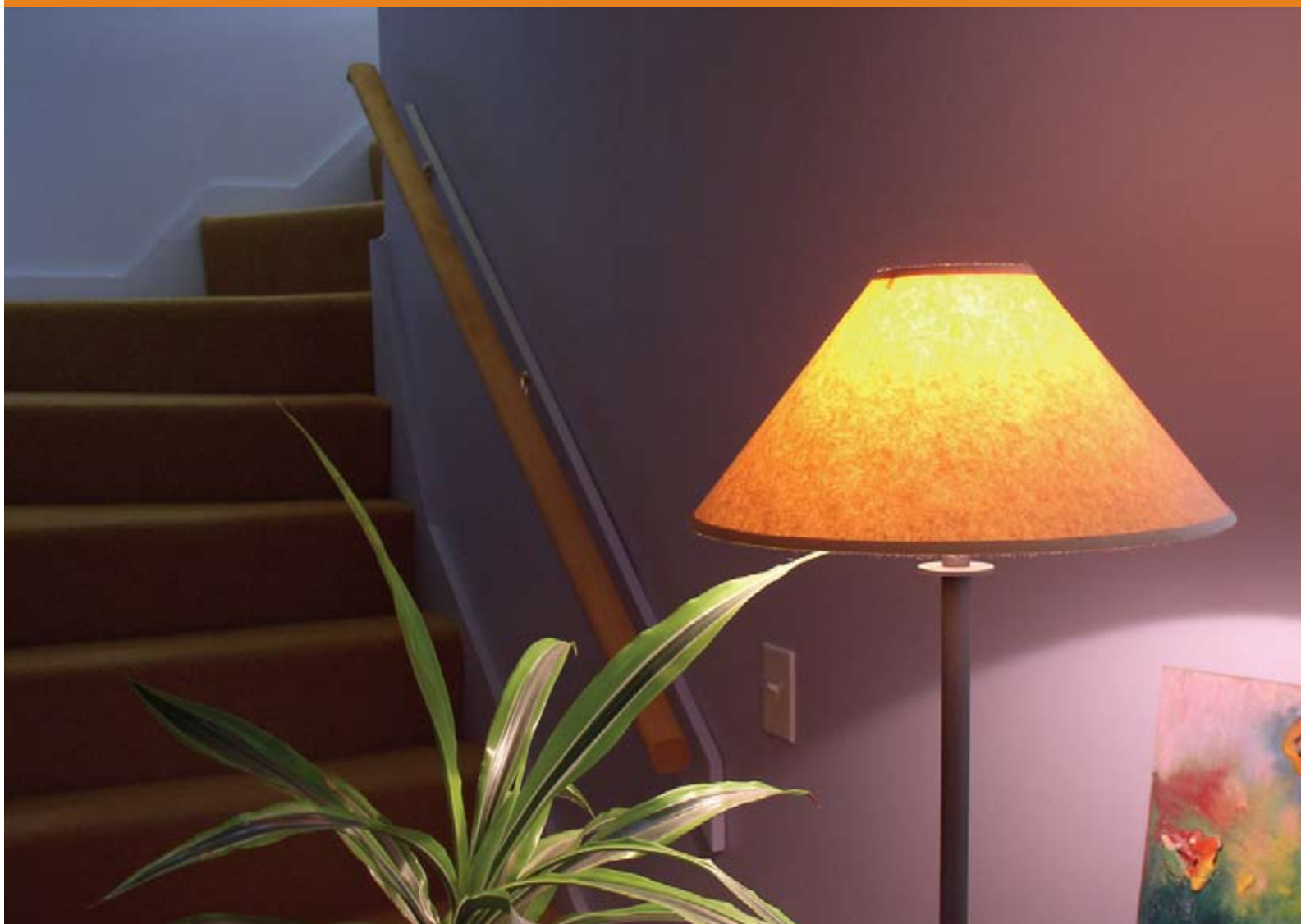




{ green home remodeling series }
healthy homes for a healthy environment

painting





why

Why Consider a Green Remodel?

SAVE MONEY

Products chosen for their durability and timeless appeal last longer and cost less to maintain in the long run. The initial extra expense of high-quality paints and premium paint supplies is well worth the investment, as they can make the painting process go smoother and the resulting surfaces more durable—so you have to repaint less often. Proper preparation of the surfaces will also reduce the likelihood of premature paint failure, saving both hassle and cost down the road.

MAKE A HEALTHIER HOME

Conventional paints, paint removers and thinners often contain toxic and cancer-causing compounds. By selecting the least toxic options and taking careful precautions, you can avoid compromising indoor air quality and your personal health. Remodeling activities can stir up household hazards such as lead-based paint flakes and dust. Minimize these risks by making safety a priority.

REDUCE ECOLOGICAL IMPACT

When you select paint shades that brighten indoor spaces, you naturally reduce the need for artificial light and consequently, save energy. By choosing durable, green paint formulations, you'll not only have to repaint less frequently, you help minimize environmental hazards—including smog—created during the production, use, and disposal of more toxic paints.

green

What is a Green Remodel?

It's an approach to home improvement with the goal of not only making your house look better, but work better—for both you and the environment. With careful planning, you can create a living space that combines beauty, efficiency, comfort, and convenience with health and conservation.

THE CHICAGO GREEN HOME REMODELING SERIES

To help you plan your remodel, the City of Chicago has produced six guides that address common homeowner concerns. Download the complete series at www.cityofchicago.org/environment (See “Chicago Green Homes”).

KITCHENS covers flooring, appliances, cabinetry, counter tops, tile and more

BATHS & LAUNDRY explore energy- and water- efficient alternatives for showers, baths, sinks, and toilets

BUILDING ENVELOPE learn weatherization techniques for your home and how to choose roofing materials, insulation, windows and more.

PAINTING topics range from removal to color choices to the benefits of low-VOC paints for family and house health

SALVAGE & REUSE learn about the reuse opportunities in your home, from flooring, molding and cabinets to products made from recycled goods

HIRING THE PROS identify how to find green contractors or architects and how to work with any contractor to ensure a green result.

painting

A new coat of paint can brighten a dark room and refresh tired walls. Few things can dramatically change a home's interior or exterior so quickly and cheaply. But paint products and the painting process itself can compromise indoor air quality, create unexpected hazards, and even release toxic substances such as lead from existing painted surfaces. According to the National Paint and Coatings Association, 600 million gallons of paint are used for architectural purposes every year. Although most of this ends up on and in buildings, a significant portion is wasted through over-purchasing or improper storage. Some of this paint ends up being improperly disposed, which threatens public health, wildlife, and water quality.

When you know the right amount and kind of paint to buy for a project, you can choose the least toxic formulation available. Then, by simply taking the recommended precautions and disposing of any unwanted paint properly, you can spruce up your home, save money and protect the health of both your family and the environment.



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rethink / remodel

Green remodeling requires a new approach to the home improvement process, with more up-front planning to take advantage of opportunities that might be otherwise missed with a conventional approach. This includes expanding your list of objectives as well as the way you compare the price of products and services—taking wide-angle and long-term views of decisions. It also means being willing to invest time and energy to find solutions that best fit your needs. Finally, a green remodel requires that you approach home improvement tasks with health and safety as priorities. This advance planning pays large dividends in terms of long-term satisfaction with your project and cost containment.

Decide What You Want

Paint projects are time-consuming and disruptive, so it makes sense to identify your needs and objectives before you start. First, define your priorities and consider all your options carefully.

health & safety

Will the project introduce hazards into the home, such as lead paint dust? If these hazards are already present, have they been addressed? Have you identified the least toxic product to do the job? Are products free of compounds known or likely to be irritating to occupants?

durability

Is the finish appropriate for the application you're considering? Is it backed with a sufficient warranty?

ecological benefit

Does the paint impact indoor or outdoor air quality? Can leftover paint be recycled, or small amounts disposed of without having to be hauled to a household hazardous waste facility? Are recycled-content paints available that meet toxicity and VOC requirements?

efficiency

Can the finish be touched up, or does it require stripping or prepping the entire surface before an additional coat is applied? Does it exhibit good hiding power; that is, does it cover well with a minimal number of coats?



minimize waste

Buy Only What You Need

Unwanted leftover paint is inconvenient, so try to order just the amount you need. Paint coverage is usually listed on the can. As a rule, porous and textured surfaces require more paint than smooth surfaces. Most major paint manufacturers provide *paint calculators* on their websites. Some are more detailed than others, offering options for interior or exterior paint projects, and factoring in such variables as whether you're painting trim, walls, or other surfaces. Use the calculator at www.govlink.org/hazwaste/house/products/list.cfm (click on Buying the Right Amount under the Paints and Solvents category) to calculate the amount of paint needed.

Make Sure the Paint You Select Works for You

Go into any paint store and you'll discover an overwhelming variety of paint products. However, finding the best one for your job requires a bit of research. First of all, make sure that the product you're considering is recommended for the surface you're painting. This will increase the odds that the paint will perform as you intend. Remember too, that proper surface preparation is vital to the long-term performance of a painted surface. See *Preparation*, page 6, for additional information.

Choose the Right Color, the First Time

Buying the wrong paint shade wastes money and time, not to mention the hassle of getting rid of unwanted paint. If you're trying out colors, look for manufacturers that provide small paint samples (usually 2-4 ounces). Then try what professional painters and interior designers do: perform a *brush out*—paint a small 12-to-16-inch square on a wall—in order to see how the shade looks with a room's actual lighting and other colors. Samples avoid the waste of trying a quart of paint that you may end up not using.

Color chips, available at paint and hardware stores, also help identify colors for your job. Bring the chips home to see how they look in natural light during different times of the day, and paired with your belongings and other shades in the house. Undamaged color chips can be returned to the store for reuse when you go to purchase your final selection.

You can also save wasted paint by not going overboard with the number of shades for your project. When you limit your palette, paint left over from one room can be used in another—tying multiple rooms together with the same color theme.

Turn someone else's waste into your resource. The Paint Exchange Room at the City of Chicago Household Chemical and Computer Recycling Center, 1150 N. North Branch allows you to drop off and/or pick up free paint that was left behind. Other sources of free or discounted paint include Habitat for Humanity ReStore (860 N. State St., Elgin, Illinois) which sells left over paint from contractors, and paint stores, which often offer discounts on paints that were custom tinted and then didn't meet customer specifications.



choose the right paint

Consider Paint Performance

When you select high-quality paints, you enhance environmental performance and reduce home maintenance chores. Why? They look and perform better—and longer—than lower-quality paints. There are several indicators to consider, but warranty is usually good shorthand for overall performance. Most experts recommend selecting the premium-grade paint with the longest warranty. Other, specific measures can provide a more detailed picture of paint performance. For example, the Green Seal program sets performance levels for scrubability (abrasion resistance), hiding power (opacity) and washability (stain removal) in its standard for paints, along with its environmental and health criteria. For details, see www.greenseal.org/certification/standards.cfm.

Choose the Right Finish

A paint's finish can also affect its performance characteristics. Flat (or matte) paints will help hide surface imperfections, but don't stand up well to scrubbing. Eggshell and satin finishes are easier to clean, but their more reflective surface reduces their ability to hide uneven surfaces. Semi-gloss and gloss finishes are the easiest to keep clean, but also highlight any surface imperfections. So the glossier the finish coat, the more important surface preparation becomes to minimize imperfections.

Choose No-VOC or Low-VOC Paints

Select paints low in, or containing no, *volatile organic compounds* (VOCs). These are now widely available. Substances that easily convert to gas at room temperatures, VOCs can trigger asthmatic or allergic reactions (depending on the compound), and even contribute to the formation of smog. As the liquid portion of paint evaporates, it can release VOCs. The EPA requires manufacturers to list any paint's VOC content. However, only those VOCs that can result in smog formation are tested in paints; many more often exist. In general, pick paint that meets your needs with the lowest VOC level possible.

Choose the Least Toxic Product for the Job

Read warning labels carefully and take all precautions listed on the product. The signal words at the top of the label—poison, warning, caution—give a general sense of the health hazards the product poses. Try to avoid products with “poison” and “warning” on the labels—these terms signify the most hazardous products. See “Hazardous Products” at www.govlink.org/hazwaste/house to familiarize yourself with the various terms and what they mean. The National Paint and Coatings Association also offers tips on how to read paint labels for safety and other health pointers at www.paint.org/con_info/health.cfm

Paint manufacturers supply a lot of information about their products in standardized forms that help you compare brands or product lines, as well as identifying hazardous compounds within various paint formulations. Technical Data Sheets (TDS) provide information on performance characteristics and other technical details. Materials Safety Data Sheets (MSDS) offer information on ingredients' potential hazards, plus details on safe handling and instructions for addressing exposure. Although written for use in the workplace, a MSDS can be helpful in determining the overall hazard of one product compared to another.

In order to help consumers identify safer paints, the organization Green Seal has created a series of criteria to evaluate paints. The criteria prohibit some toxic compounds, and limit others. Paints also must meet performance standards relative to hiding power, durability, and ease of maintenance. Not all manufacturers have submitted their paints for Green Seal certification, so it helps to compare a product's TDS and MSDS to the Green Seal criteria. Find the Green Seal standards online at www.greenseal.org/certification/standards.cfm.

Did you know that the paint color you choose can actually reduce your electricity bill? Lighter colors bounce light from windows and fixtures, reducing the need for additional artificial light. Dark colors can help create a mood, but make a room darker and feel smaller. Remember too, that colors tend to look darker on inside walls than they do on a color chip.

paint options

latex (water-based)

Environmentally superior to old-fashioned alkyd (oil-based) paint, latex paint consists of a synthetic resin (usually polyvinyl acetate or PVA), titanium dioxide pigment, and water as the solvent (the substance that keeps the paint in liquid form until applied). It does not contain latex, the natural rubber compound. Rather, “latex” is a term used for any substance that retains a level of flexibility when dried. Vegetable-oil modified latex paint replaces some of the petroleum-based elements of conventional latex paint with renewable vegetable oils. These paints may have to be special ordered. Recycled-content latex paints may also be available.

acrylic

Formulated much like latex paint, except that the PVA resin is replaced by acrylic resins. Acrylic resins are generally more durable than latex resins, resulting in a higher-quality paint. All-acrylic and latex-acrylic paint blends are available.

plant-based oil

Generally imported from Europe, where demand for bio-based paint products (derived from plants) is currently stronger than in the United States. Remember, just because a paint product is plant-based doesn't mean it's nontoxic or safe. Even plant-based oil paints often contain toxic drying agents or heavy metals, and some plant oils such as linseed oil can be fatal if swallowed. Usually high in VOCs, which contribute to smog formation and can trigger respiratory problems. Like alkyd paints, plant-based oil paints must be thinned with harmful solvents. See “Cleanup, Storage & Disposal” on page 9 for more on thinners.

alkyd (oil-based)

A class of paints that uses synthetic resin and an oil base as the solvent. Must be cleaned up with paint thinner. More hazardous to work with from the human health perspective, due to flammability and substantially higher VOC levels compared to water-based paints. Tend to yellow and become brittle with age.

lime paint

Named for the inclusion of lime (the mineral, not the citrus fruit) in the formulation, as well as pigments, stone dust, and glues. The lime is heated to approximately 900 degrees Fahrenheit to drive off carbon dioxide. When mixed with water, this slaked lime then undergoes a chemical reaction that creates a hard surface. Lime is a caustic substance that can burn skin, eyes, and lungs, so always follow safety instructions. Should be applied with a natural bristle brush as lime degrades synthetic bristles.

plaster

While not technically paint, plaster can take the place of paint as a colorful wall finish. However, plasters require more skill than paints to achieve professional results. A mix of clay, pigments, stone dust and sometimes plant fiber such as straw, clay plasters can be applied by trowel to almost any primed wall surface. Other plasters, such as Venetian plasters, can also contain acrylics and other synthetic compounds. In addition to sand, lime plasters contain lime (hence their name) and sometimes Portland cement—both of which are highly alkaline substances that can destroy skin, eye, and lung tissue—and require appropriate caution.

milk paint

Sometimes called casein paint, after the milk protein from which it's derived. Usually purchased in dry form, to be mixed at home with water and used immediately—milk paint can sour if left in a wet state too long. Seemingly environmentally attractive since it's made from nontoxic ingredients, but offers questionable durability in many situations. Designed for interior use only, requiring dry, low-traffic applications. A clear finish coat can increase longevity, but often erases the environmental benefit of using milk paint.

recycled paint

All paint products bear some sort of environmental cost. Paints with recycled content reduce this by turning a would-be waste product into raw materials for new paint. Commercially produced recycled content paint contains 50-80% recycled content and is filtered, mixed, sorted and tested to ensure consistent quality. It may need to be special ordered (usually at no cost to the consumer), so call ahead for availability. Colors are often limited to earth tones. See the National Paint and Coating Association at www.paint.org/con_info/health.cfm for information on recycled paint.





choose the right tools

Stroll down the paint aisle at your local hardware store and you may feel compelled to stock up on dozens of paint supplies. Reduce waste by buying only what you need. Here's a list of the basics, plus helpful hints on selecting the best tools for your project.

Brushes

A good paintbrush can make a world of difference in the results of your paint project and if properly cared for can last many years. For tips on cleaning and storing brushes, see "Cleanup, Storage, and Disposal" on page 9. Choose a brush depending on the kind of paint you're using and the job at hand – a flat brush for surfaces, and angled brushes for corners and trim. In general, synthetic bristle brushes perform best with latex and acrylic paints, while natural bristles are recommended for oil-based paints (both petroleum-based and plant-based oils). Cheap, disposable brushes (both foam and bristle) create waste and usually cost more in the long run. The one exception involves oil-based paints. The verdict's out as to whether it's environmentally preferable to use a cheaper brush for an oil-based paint job and then dispose of it, or use paint thinners to clean and reuse the brush. Avoid the confusion by choosing water-based paints instead.

Rollers

Paint rollers come in a variety of forms, sizes and finishes. Like brushes, the roller you choose depends on the paint you use. Select the pile depth of the nap based on the surface you're painting: the rougher the surface, the deeper the pile. Avoid rinsing your roller covers by wrapping them in foil or plastic overnight for reuse the next day.

Drop Cloths or Tarps

Protect floors, heavy furniture and other items you can't easily remove from a room or shield plants as well as catch flakes and dust on an exterior paint job with a drop cloth or tarp. Old newspapers can do the trick inside, but are best for small jobs that don't entail disturbing existing coats of paint, since they won't protect surfaces from lead dust. Cotton duck canvas drop cloths offer superior performance, and can last a lifetime if properly maintained. Rented or share them—check with neighbors, friends or family members who might be willing to lend you one, or even go in on this investment with you.

Plastic drop cloths have become popular. In fact, they're recommended for containing lead-based paint chips and dust because they're disposable. (For more help on safely dealing with lead-based paint, see *Resources* on page 12.) When lead is not a concern, reusable drop cloths obviously make a greener choice. If a plastic tarp is your preference however, consider thicker plastic that can hold up to multiple uses.

Tape

The type of tape you'll need will depend on how and what you'll be painting, as well as whether you're likely to disturb any existing paint you suspect contains lead by sanding, stripping, or scraping. If lead is an issue, the U.S. EPA makes special tape recommendations, including duct taping plastic tarps to baseboards and sealing off work areas from the rest of the house. For more information and publications, see www.epa.gov/lead or call the National Lead Information Center at (800) 424-LEAD.

If you do need to use tape, choose a product marketed as painter's tape to ensure that the tape won't damage the surface you're taping. Standard masking tape (and even low-quality painter's tape) can pull existing paint from surfaces and leave a sticky residue—so spend a little more for the good stuff. You can often avoid taping around trim and other tight areas with careful painting and good angled brushes.

Other Paint Tools

Paint sprayers are sometimes used for larger jobs or where a particularly uniform finish is desired. However, they can waste paint and entail a large amount of cleanup, as well as pose health risks to the sprayer, such as respiratory problems from inhaling vapors and injecting paint under the skin and into the bloodstream. Because of these potential hazards, the use of sprayers is best left to professionals. Additionally, many sprayers work best with thinned paints, and some water-based paints cannot be thinned. So unless you're painting very large surfaces (such as your home's exterior), consider painting by hand.

Here's a waste-reducing tip if you've got a multi-day paint job: store brushes and rollers overnight without rinsing them out first. Simply cover brushes and rollers in a tight-fitting plastic bag or with plastic wrap (making sure to remove air), and then place them in the freezer until you're ready to use them the next day.

preparation

Proper surface preparation is key to a lasting paint job. Paint relies on a strong bond to the surface it's protecting. At the same time, preparing surfaces can introduce hazards into your home, namely lead paint chips and dust. Fortunately, if you pair proper surface preparation with rigorous safeguards against lead paint exposure, you can refresh your walls without sacrificing your family's health. See "Resources" on page 12 for help.

Experts agree that thorough preparation of the surface to be painted is essential. In fact, well over half the total time spent on a job should be devoted to the prep stage. First, carefully clean the surface with warm water and a clean-rinsing, nontoxic or low-toxic cleaner; any dirt or oil will compromise the holding power of the new coat.

Paint Primer

Is primer necessary? In general, if the surface you're painting is previously unpainted, weathered, or otherwise likely to challenge the adhesion of the final coat, you should use a primer. Specially formulated to adhere to surfaces, primers provide a good surface for topcoat adhesion. A properly primed surface will help the final coat last longer and look better. Some primers keep rust and wood tannins from discoloring the finish coat, too. (If bleeding is a likely problem, consult your paint professional about the best, and least toxic, primer for the job.) So skip the temptation to leave out the primer step, if you want your paint job to last for years to come.

Many believe that an oil-based primer is necessary, especially with exterior wood. Actually, oil-based paint products harden over time, making them vulnerable to cracks and failure. New formulations of high-quality acrylic (water-based) primers are proving themselves equal, if not superior, performers with substantially less toxicity. Plus, they clean up with water! Latex primers stay flexible over time—a real advantage on exteriors where heat and weather cause paint substrates to expand and shrink over time. A paint professional can help you choose the primer most appropriate for your job. Just make sure that health and safety priorities are factored in with your performance goals.

Cleaning Surfaces

A new coat of paint requires a clean surface to cling to—but cleaning products can be toxic in themselves. So choose the safest cleaner for the job. Often, a simple solution of soap and water is all you'll need. Castile soap, made from natural plant oils, works well. If areas are greasy, increase the proportion of soap to water. Follow with a rinse of clear water to remove all traces of soap, and then allow surfaces to dry thoroughly. If your project requires something stronger, look for the least-toxic, non-chlorinated, non-acid cleaner. Mild cleansers with calcium carbonate, feldspar, and sodium carbonate make good choices. Avoid cleaners with the words "Poison" or "Danger" on the label; "Caution" and "Warning" signify less hazardous products. Obviously, products without warning language offer the safest choice.

Long the standard for cleaning painted surfaces, *trisodium phosphate* (TSP) is a highly concentrated alkaline solution that can damage lungs, eyes and skin. It also contains phosphates, which have been phased out of most cleaning products due to their negative effect on water quality; they promote the growth of algae and limit oxygen content in water to the detriment of fish. Phosphate-free TSP is now available, but its cleaning power is questionable. For general guidelines on how to avoid household hazardous materials, see "Addressing Indoor Environmental Concerns During Remodeling" (<http://www.epa.gov/iaq/homes/hip-front.html>).

Many professionals and do-it-yourselfers use high-pressure washers to clean exterior surfaces and siding. If you choose this cleaning option, take care not to damage underlying wood. Also allow the siding plenty of time to thoroughly dry before painting. Pressure washers should not be used for paint removal.



Surface preparation and paint removal can release hazardous lead-based paint into the home.

For help with reducing this hazard, see www.epa.gov/lead

or call (800) 424-LEAD.



removing paint safely

While hand-sanding or scraping may be necessary to remove loose paint chips, widespread paint removal is not recommended unless there are extensive deep cracks or blistering that reveals bare wood. Paint removal entails the use of chemicals, abrasion or heat—all of which pose difficulties or hazards. Abrasive techniques (sanding, wire brushes, etc.) can release toxic lead paint dust and chips, and damage wood if improperly used. Heat guns pose a fire risk and can vaporize the lead in old paints, creating an intense inhalation hazard. Because of these fire and health risks, do-it-yourself techniques are not recommended. Paint removal, though often labor-intensive and expensive to contract out, is often best left to the professionals.

Chemical Strippers

If old paint is in good condition, it makes a perfectly suitable surface for additional paint, and stripping is often unnecessary. Most paint strippers contain harmful solvents and caustic materials and are some of the most toxic consumer products sold. Volatile organic compounds and other compounds contribute to ground-level smog and air pollution. Many conventional stripping products contain *methylene chloride*, a toxic skin irritant that is listed by the U.S. EPA as a “probable human carcinogen.” In addition, short-term exposure to methylene chloride can affect the central nervous system; high exposures over long periods can cause kidney and liver damage, or even death. Methylene chloride evaporates quickly, and is easily inhaled. To learn more about the hazards of conventional paint strippers, read the Consumer Products Safety Commission fact sheet “What you Should Know about Using Paint Strippers” at www.cpsc.gov/cpscpub/pubs/423.html.

Given the hazards associated with paint strippers, make sure your surfaces require paint removal before using them. If you do decide to purchase a paint stripper, look for a product without methylene chloride. In general, products with fewer warnings on the label are less hazardous. However, many of the less-toxic paint strippers still rely on caustic chemicals to soften and remove paints. Always use skin and eye protection with caustics. Plant-based products offer the environmental benefit of being made from renewable sources. But don’t assume that a paint remover such as citrus oil is safe for you and your family, simply because it’s advertised as coming from natural sources. Whatever the product, always follow the precautions on the label.

Lead-Based Paint Removal

If your home, like many Chicago residences, was built before 1978, it almost certainly contains some lead-based paint. Renovation or repainting projects very often release this hazard into your home. For this reason, only licensed professionals should attempt lead paint removal. Do-it-yourself lead paint removal is likely to increase rather than decrease health risks. Lead-based paint most severely affects children under the age of 6 by prohibiting brain-stem growth and limiting mental development. These negative effects can also be transmitted to the child through a pregnant mother who has been exposed to lead-based paint.

In older homes where lead-based paint is suspected, precautions should be taken to avoid dry sanding. Spraying the surface with water or continually running a damp towel over the surface while sanding will greatly decrease the creation of lead contaminated dusts. To learn more visit the U.S. Environmental Protection Agency’s (EPA) website at www.epa.gov/lead, then click on “Remodeling or Renovating a Home with Lead-based Paint”. Download the EPA’s free guide, *Reducing Lead Hazards when Remodeling Your Home* or order a paper copy by calling (800) 424-LEAD.

Troubleshooting Paint Problems

Learn whether paint removal is required, or assess the extent to which it is, by properly troubleshooting paint problems. Paint failures often indicate fundamental problems, such as moisture, improper application, inadequate surface preparation, or the use of an inferior quality paint. While repainting may temporarily mask these problems, avoid a future paint failure—and removal—by addressing the underlying issues.

For more information about the impact of lead-based paint and how to handle it, go to the Chicago Department of Public Health’s website at www.cityofchicago.org/health—look in the Environmental Health section under Childhood Lead Poisoning Prevention.

paint problems & solutions

PROBLEM	POSSIBLE CAUSE	SOLUTION
peeling	moisture collects behind paint film and impairs adhesion	Locate and eliminate source of moisture. Excess interior moisture should be removed from the building through proper ventilation. To find exterior moisture, correct faulty flashing, leaking gutters, defective roof shingles, cracks/holes in siding and trim, deteriorated caulking, and shrubbery growing too close to painted wood. After solving moisture problem, let wood dry out thoroughly. Scrape off damaged paint with a putty knife, then hand or mechanically sand surface. Prime and repaint.
cracking/ alligatoring	advanced stages of crazing (see below), with deep horizontal and vertical cracks; surfaces may also flake in extreme cases	Cracking/alligatoring is commonly associated with the deterioration of lead based products. Total paint removal is generally required. Read the section on lead-based paint removal on page 7.
crazing (fine, jagged inter-connected breaks in top layer of paint)	paint that's several layers thick becomes hard and brittle with age, so it's no longer able to expand and contract—resulting in hairline cracks	Treat by hand or mechanically sanding surface, then repaint. Hairline cracks may show through, but surface will be protected. Although harder to detect than more obvious paint problems, crazing over time can result in deep cracking and alligatoring—a condition requiring total paint removal.
intercoat peeling	improper surface preparation prior to the last repainting, or incompatibility between paint types (such as oil-based and water-based paints)	Scrape peeling topcoat, wash thoroughly, and wipe dry, then hand or mechanically sand. Apply a high-quality, least toxic primer that meets the final coat's manufacturer specifications, then repaint.
solvent blistering	exterior paint applied in direct sunlight can cause top surface to dry too quickly, solvent trapped beneath the dried surface, forces its way through the paint film	First, determine whether the blistering is solvent blistering. Cut open a blister; if another layer of paint is visible, it's probably solvent blistering. If bare wood is visible, it's more likely moisture-related blistering (see Peeling, above). Scrape, then hand or mechanically sand affected surfaces down to the next sound layer; repaint. Make sure paint is not applied in direct sunlight.
wrinkling	caused by applying paint too thickly, painting a second coat before the first one dries, inadequate brushing out, or painting in temperatures higher than recommended	Remove the wrinkled layer by scraping, then hand or mechanically sand to create as even a surface as possible. Repaint following manufacturer's application instructions.
dirt, soot, cobwebs	lack of regular surface maintenance	Remove with strong spray from a garden hose. For persistent surface matter, scrub with water and a medium bristle brush, then rinse with clear water. For stubborn soot, combine a small amount of biodegradable, non-toxic soap (such as Castile soap) with water. General cleaning may refresh surfaces so that they don't require painting.
mildew	fungi feeding on nutrients in paint or materials deposited on painted surface	Moisture is the biggest culprit so start with prevention. Prune back vegetation; fix gutter leaks and/or improper drainage around building. To kill and remove existing mildew, wash with a small amount of household detergent in a gallon of water, then rinse with clear water. Let dry thoroughly before repainting. Latex- or acrylic-based paints are more resistant to mold and mildew growth than oil-based paints.
excessive chalking (powdering of the paint surface)	disintegration of resins in paint from low-quality resins, or exposure to ultraviolet light from sunlight	Excess chalking can wash onto other surfaces and cause streaking or paint disintegration. Rinse the chalking away, then repaint the surface. Reduce the likelihood of future chalking by using high-quality paint.
staining	moisture reacting with building materials (iron nails or other metals, etc.) or natural oils (tannins, etc.) within the wood	Locate the source of the stain and correct the moisture problem. For rust and oxidation stains from metals: hand-sand and coat metals with a rust-inhibiting primer followed by two finish coats. Prime, then countersink and fill nail heads. For stains from wood oils and tannins: clean with a solution of equal parts denatured alcohol and water, then rinse and dry. Apply a stain-blocking primer especially developed for preventing this type of stain. Allow at least 48 hours between each primer coat. Repaint.

Table adapted from the National Parks Service Historic Preservation Brief #10 "Exterior Paint Problems on Historic Woodwork", available at www2.cr.nps.gov/tps/briefs/brief10.htm and used with kind permission.



For other issues related to indoor air quality during remodeling, see “Addressing Indoor Environmental Concerns During Remodeling” at www.epa.gov/iaq/homes/hip-front.html.

painting

After all this preparation, it's time to paint. Follow manufacturer instructions regarding rate of application, air temperature, and ventilation. In the Chicago area, anytime from late spring to early fall works well as the warm weather makes keeping windows open for extended periods possible. Of course, if you opt for a low/no-VOC, or low-toxic paint, you'll reduce the amount of off-gassing, but all newly painted rooms require plenty of fresh air while the paint cures. Manufacturers seldom list a specific amount of time for airing out a room; the EPA suggests at least two to three days after painting.

To provide adequate ventilation in a room while painting: open all windows and doors, place a fan, blowing *into* the room, in the doorway, and begin painting near the window farthest from the fan, working back toward the fan. This method introduces more air into the room and increases the likelihood that you'll breathe fresh air by keeping fumes downwind. For more information on indoor air quality and/or ventilation while painting, see “Painting and IAQ” at www.epa.gov/iaq/homes/hip-painting.html or “What is Adequate Ventilation” at the Environmental Home Center (<http://www.environmentalhomecenter.com/learn.shtml>).

cleanup, storage & disposal

Cleanup

Cleanup is a snap if you're using water-based paints—yet another reason to choose these formulas over oil-based varieties. Water and a mild soap are all you need. The trick is to catch paint drips and splatters while they're still wet, so keep a clean cloth handy as you paint. Remove dried latex or acrylic paint with vinegar.

For cleaning paint tools with a minimum of water use and wasted paint down the drain, follow this proven technique:

- Remove as much paint from the brush or roller as possible by painting over a previously painted area. This technique can sometimes leave brush or roller marks so pick an inconspicuous area such as a closet, or simply roll or brush on newspaper.
- Fill a container, such as a gallon bucket with warm water and clean the brushes to remove the majority of the paint. For more stubborn dried latex, use hot vinegar and soak for an hour or more.
- Transfer the brushes to a second container filled with clear water and rinse.
- If you're undertaking a multi-day painting project, cover the containers and let them stand overnight. The majority of the paint solids will settle to the bottom of the container. Then the clear water can be poured off to reuse for additional rinsing.
- Scrape out paint solids from the container onto a piece of waste cardboard or newspaper, then allow to dry away from pets and children. Dispose of small quantities of dried latex with your household trash.
- Always dispose of water contaminated with paint in a sink attached to the sanitary sewer. Releasing paint or rinse water down a storm drain is bad for the environment.
- Hang paintbrushes and roller tubes to dry. Always remove roller tubes from handles before drying.

If you decide that your project requires oil-based paints, you'll need a paint thinner for cleanup. Like their paint counterparts, oil paint thinners can be either petroleum or plant-derived. Accordingly, don't assume that because a solvent comes from a plant it's safer than a petroleum-based product. Look for the least toxic paint thinner that will do the job.

Odorless mineral spirits are less toxic and less flammable than conventional mineral spirits. They have been processed to remove the aromatic hydrocarbons, which are the more toxic compounds in mineral spirits. Avoid products containing *methanol*; it can aggravate heart conditions and is also readily absorbed by contact lenses—making it particularly hazardous to the eyes. In general, avoid skin contact with any solvent thinners as they can be absorbed and enter the bloodstream.

Unused or paint-laden thinners must be disposed of at a household hazardous waste site (see *Getting Rid of Unwanted Paint* below); they should never be poured down the drain or on the ground outside. Paint thinners can be strained and reused. Because solvent thinners also pose a fire hazard, always follow precautions on the label for their use and storage, as well as the disposal of any rags and materials saturated with thinners.

Storage

Once completely dry, wrap brushes in paper (a piece of paper grocery bag works well) to protect the bristles from becoming bent in storage. High-quality brushes often come packaged in reusable covers; use them to protect bristles between jobs. Hang brushes to keep bristles straight.

Store leftover paint in the original can marked with the date and room it was used in. Dabbing a sample of the paint on the lid can also help identify the paint for future use. To keep a can tightly sealed, place plastic wrap over the can and firmly replace the lid, using a rubber mallet or the palm of your hand to secure it (a hammer can distort the lid or can). Store the can upside down, in a space separate from your living space and protected from freezing temperatures.

Getting Rid of Unwanted Paint

If you've been successful at buying the right amount of paint, you should have just enough left over for touch-up jobs. Sometimes, however, you still end up with more paint than you need. Bring your leftover paint to the Paint Exchange Room at the City of Chicago Household Chemicals and Computer Recycling Facility, 1150 N. North Branch or post it online on Craigslist (<http://chicago.craigslist.org>) or Freecycle (www.freecycle.org). Also, the Illinois EPA (IEPA) has initiated a program called Partners for Waste Paint Solutions in partnership with local paint dealers and hardware stores. You can take unwanted paint to these locations, where it will be remixed so it can be reused. Although there are currently no locations in the city of Chicago, there are several in the nearby suburbs. For a complete list, see IEPA (www.epa.state.il.us/land/citizen-involvement/paint.html).

If your paint job requires oil-based paints, cleaners, stains and varnishes that contain hazardous components, do not pour these down the drain. The leftover contents of such consumer products, commonly referred to as "household hazardous waste", can create a risk to people and the environment when disposed of improperly. Again, you can bring these materials to the City of Chicago's permanent Household Chemicals & Computer Recycling Facility at 1150 N. North Branch for proper disposal. Visit www.cityofchicago.org/environment for hours, directions, and a list of accepted items.

Latex (water-based) paints can be disposed of with your household garbage. You can rinse and recycle empty latex cans with other metals. Leave the can open or place shredded newspaper in the can to help the drying process.





maintenance

Learn more about Healthy Living by visiting “Healthy Home” at “Care2 Make a Difference” (www.care2.com/healthyliving).

Painting takes time, money, and natural resources. Get the best return on your investment by taking care of your new surfaces. Proper cleaning practices can extend the life of your paint job. Improper practices can shorten the finish life and introduce unhealthy chemicals into the home.

Cleaning

To protect both your paint and also your family’s health, use green cleaning methods. Most interior paint finishes simply require a damp cloth for removing dust and cobwebs. If an area needs deeper cleaning, try a solution of water mixed with a mild, all-purpose soap (such as Castile soap). You can also use a proven—and very affordable—homemade cleanser of baking soda, vinegar and water.

Preventive Actions

As mentioned previously, paint often fails due to moisture issues. When you remove or minimize moisture problems, you avoid paint failures down the road. If you have a newer home with more air-tight construction, pay particular attention to ventilation issues.

Inside, make sure fans in the kitchen and bathrooms vent to the outdoors, and always use them or open a window when cooking and bathing. A bathroom should be vented for at least ten minutes after a shower, or until the fog disappears from the mirror. Put fans on timers and use switches separate from lighting to ensure that you’re venting a space adequately; you’ll save energy, too. A low-volume whole-house fan on a timer also reduces moisture content in the home, which in turn minimizes the amount of moisture migrating through walls and out exterior siding—a common source of exterior paint failure. If you’re in the market for ventilation fans, look at Energy Star® certified models. They use 65% less energy than standard fans, so you’ll cut your electricity bills, as well. See www.energystar.gov for more information; look under *Products—Heating and Cooling—Ventilating Fans*.

Outside, make sure that gutters and downspouts drain freely and don’t leak. Keep trees, shrubs and plants at least 12 inches away from siding and painted surfaces. Siding that’s allowed plenty of fresh air and the chance to dry will hold paint longer.

Maintain caulking and flashing around windows and doors. Failed caulk or loose flashing can introduce water behind the siding—a hazard not only to paint but to your home in general.

Finally, a well functioning roof is a necessity in the Chicago climate. Check the quality of your roofing to avoid potential leaks, which can cause ceiling and wall stains, as well as substantial invisible damage and mold problems. If you’re considering a new roof, see the Green Home Remodel guide Building Envelope available at the Chicago Department of the Environment (www.cityofchicago.org/environment) and click on Chicago Green Homes.

resources

Books

- *Healthy House Building for the New Millennium* by John Bower (Healthy House Institute, 1999). Covers all aspects of building a healthy house, and contains a chapter on paints and finishes.
- *The Natural Paint Book* by Lynn Edwards and Julia Lawless (Rodale Books, 2003). Explores the differences between conventional and natural paints—and even provides recipes for natural paints that can be made at home.
- *The Natural Plaster Book* by Cedar Rose Guelberth and Dan Chiras (New Society Publishers, 2003). Comprehensive guidebook for those considering earth, lime, or gypsum plasters for their project.

Websites

- For additional information on paint disposal, see the Illinois Environmental Protection Agency (IEPA) at www.epa.state.il.us/land/citizen-involvement/paint.html. For additional information on recycling paint, see “Recycle Your Stuff A to Z” at the Chicago Recycling Coalition at www.chicagorecycling.org/index.php.
- National Paint and Coatings Association offers consumers information about lead-based paints at www.paint.org (click on *Consumers* and select from menu).
- For other issues related to indoor air quality, see “Addressing Indoor Environmental Concerns During Remodeling” at www.epa.gov/iaq/homes/hip-front.html.
- The US Environmental Protection Agency maintains an excellent resource on lead-based paint hazards at www.epa.gov/lead. Click on “Remodeling or Renovating a Home with Lead-based Paint,” or call (800) 424-LEAD.
- The “Storehouse of World Vision” accepts donations of unopened cans of paint as well as surplus building materials. For more information, see www.worldvision.org/thestorehouse, or call 1-800-279-6209 ext. 315 or 773-921-3900 ext. 368.

The Chicago Center for Green Technology

The Chicago Center for Green Technology (CCGT) is a great public resource for green remodelers, offering year-round educational programs and workshops on architecture, engineering, interior design, building construction and management, green business, and landscape design, many of them for free. CCGT also houses the Green Tech Resource Center, a library containing samples of environmentally-friendly building and design materials, in addition to books and periodicals including those referenced in the Chicago Green Remodeling Series. For more information and building hours, visit their web site at www.cityofchicago.org/environment/greentech or call (312) 746-9642. CCGT is located at 445 N. Sacramento Blvd. in Chicago.

Enroll in Chicago Green Homes

To take your home to an even higher level of environmental sustainability and energy efficiency, enroll in the City of Chicago’s Green Homes Program. Chicago Green Homes is a flexible, voluntary, point-based certification system which encourages the use of environmentally-friendly building practices and materials. Choosing from a checklist of options and strategies, developers, builders and homeowners can earn points for their residential projects. Upon review and approval by the Chicago Department of Environment, a Chicago Green Homes Certificate will be issued with a 1, 2, or 3-star rating depending on the number of points attained. Participants will also be granted the use of the Chicago Green Homes logo, and their projects will be listed on the City’s website.

To learn more about Chicago Green Homes or the Chicago Green Remodeling Series, visit the Chicago Department of Environment’s website at www.cityofchicago.org/environment (See “Chicago Green Homes”) or call (312) 744-7606.





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