


{ green home remodel } 
healthy homes for a healthy environment

painting





green

What is a Green Remodel?

It's an approach to home improvement with the goal of not only making your home look better, but work better—for both you and the environment. Want a healthier home? Lower utility bills? Reduced maintenance? A cleaner planet? A green remodel helps you realize a range of far-reaching benefits from a single smart design. With careful planning, you can create a home that combines beauty, efficiency, comfort and convenience with health and conservation.

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.

painting

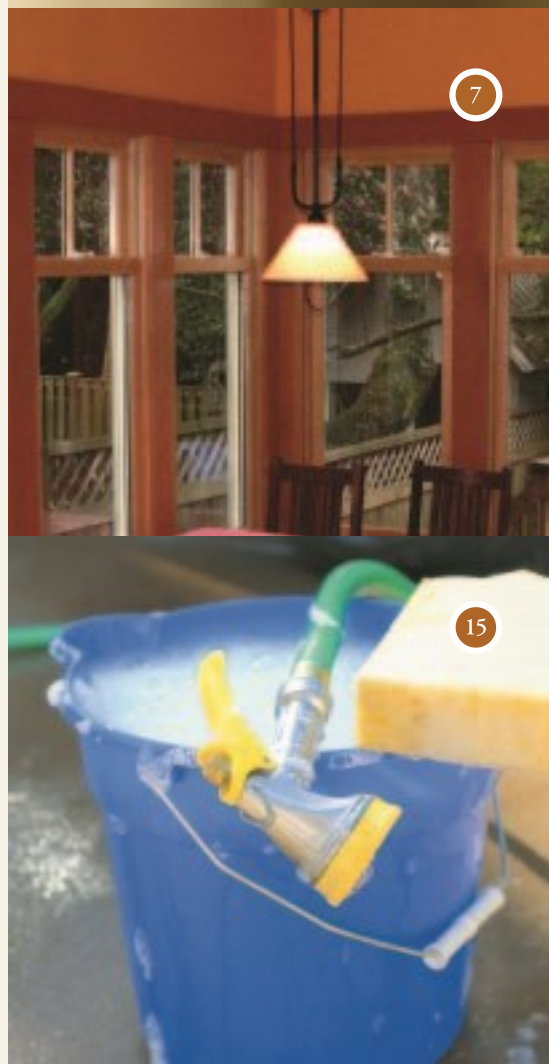
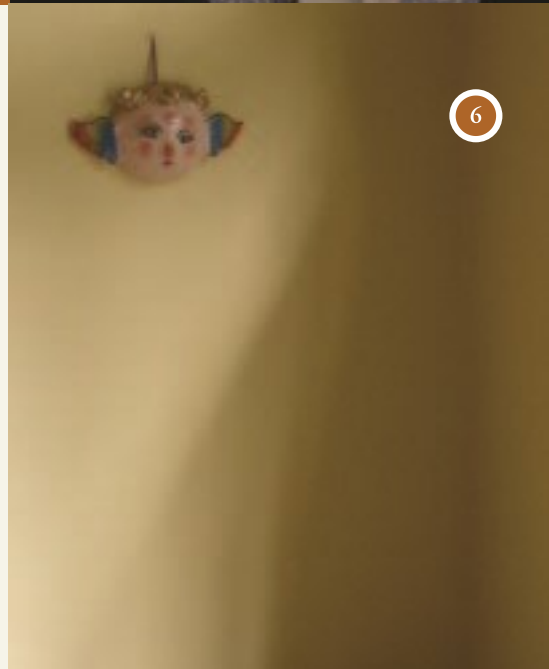
A new coat of paint can brighten a dark room and refresh tired walls. Few things can dramatically change a home's interior or exterior so quickly and cheaply. But paint products and the painting process itself can compromise indoor air quality, create unexpected hazards, and even release toxic substances 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.

Cover photo and above: Olivia Salamon.

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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 your 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

Is the finish spot repairable, 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?

Do Your Homework

Research helps you ask retailers or your contractor the right questions—or avoid costly mistakes if you are doing the work yourself. Finding green products can sometimes be a challenge, but is becoming easier as more enter the marketplace. Start early to look for businesses that carry the products you like. Learning about cost and availability will help you avoid expensive, last-minute decisions. The internet can be a great place to start when searching for information and products—but be aware of biases in information sources. The line between sales pitch and factual information can be quite blurry on the web (and in person, for that matter). Visit www.seattle.gov/sustainablebuilding and click on *Green Home Remodel* for an extensive resource list related to topics in this guide.

The Green Home Remodel

series at www.seattle.gov

sustainablebuilding will help

increase the environmental

performance of your project.

Find guides on:

- Kitchen,

- Bath & Laundry,

- Roofing,

- Landscape Materials,

- Salvage & Reuse, and

- Hiring a Pro.



remodel safely

It's important to recognize and avoid potential hazards painting projects can create. These fall into two general categories: hazards related to the painting process—namely, lead-based paint risks—and hazards introduced by paint products themselves.

Lead-Based Paint Hazards

If your home, like most Seattle residences, was built before 1978, it almost certainly contains some lead-based paint—and renovation or repainting projects very often release this hazard into your home. Learn more by going to the U.S. Environmental Protection Agency (EPA) informational website at www.epa.gov/lead, then click on *Remodeling or renovating a home with lead-based paint*. The EPA's free guide, *Reducing Lead Hazards when Remodeling Your Home*, is an essential resource; simply download it or order a paper copy by calling (800) 424-LEAD.

The Washington Toxics Coalition also maintains an excellent fact sheet, "Reducing Exposure to Lead in Older Homes," which has a specific section on remodeling and paint removal. To find it, go to www.watoxics.org and click on *Toxics in the Home* and then *Building Materials*. Only licensed professionals should attempt lead paint removal. Do-it-yourself lead paint removal is likely to increase rather than decrease health risks.

Choose the Least Toxic Product for the Job

Read warning labels carefully and take all precautions listed on the product. The *signal word* at the top of the label (poison, warning, caution, etc.) gives 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. Go to 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

In order to help consumers identify safer paints, the organization Greenseal 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 Greenseal certification, so it helps to compare a product's *Technical Data Sheet* and *Materials Safety Data Sheet* (see below) to the Greenseal criteria. Find the Greenseal standards online at www.greenseal.org/standards/paints.htm

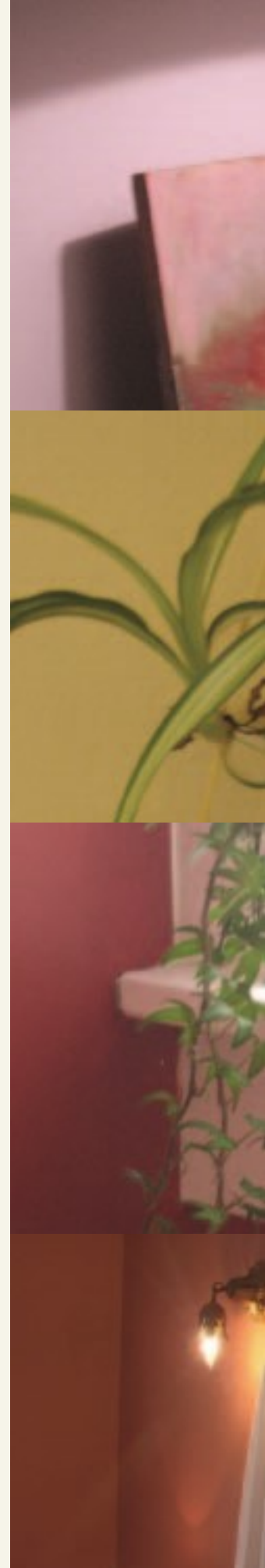
Paint manufacturers supply a lot of information about their products in standardized forms that help you compare brands or product lines, as well as identifying hazardous compounds within various paint formulations. Technical Data Sheets provide information on performance characteristics and other technical 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.

Choose Low-VOC Paints

In addition to choosing a low-toxic product, look for paints low in *volatile organic compounds* (VOCs). 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.

Make Sure the Paint You Select Works for You

Some people are especially sensitive to various compounds found in paints, such as formaldehyde, chemical preservatives and fungicides. If you suspect you or someone in your home falls into this category, look for paints formulated specifically for chemically sensitive individuals. Here's a tip for testing your sensitivity to a particular paint: place a sheet painted with the prospective paint in your living space for 48 hours. If you experience a reaction, try other formulations until you find one that's acceptable.



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.



choose the right paint

In order to choose the best paint for your project, it makes sense to learn about the different types of paints available and their various applications.

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 9, for additional information.

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/standards/paints.htm

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.

paint options

latex (water-based)	<p>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). 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.</p> <p>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.</p> <p>Recycled-content latex paints are also available, see page 5 for more on recycled paints.</p>
acrylic	<p>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.</p>
plant-based oil	<p>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 <i>Cleanup & Storage</i>, page 11, for more on Thinners.</p>
alkyd (oil-based)	<p>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.</p>
lime paint	<p>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.</p>
plaster	<p>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.</p>
milk paint	<p>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.</p>

Get free recycled paint from Seattle Public Utilities' Reuse Store! Surplus latex paint from Seattle residents is blended and made available for indoor and outdoor applications. Call (206) 615-0731 for details.



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.

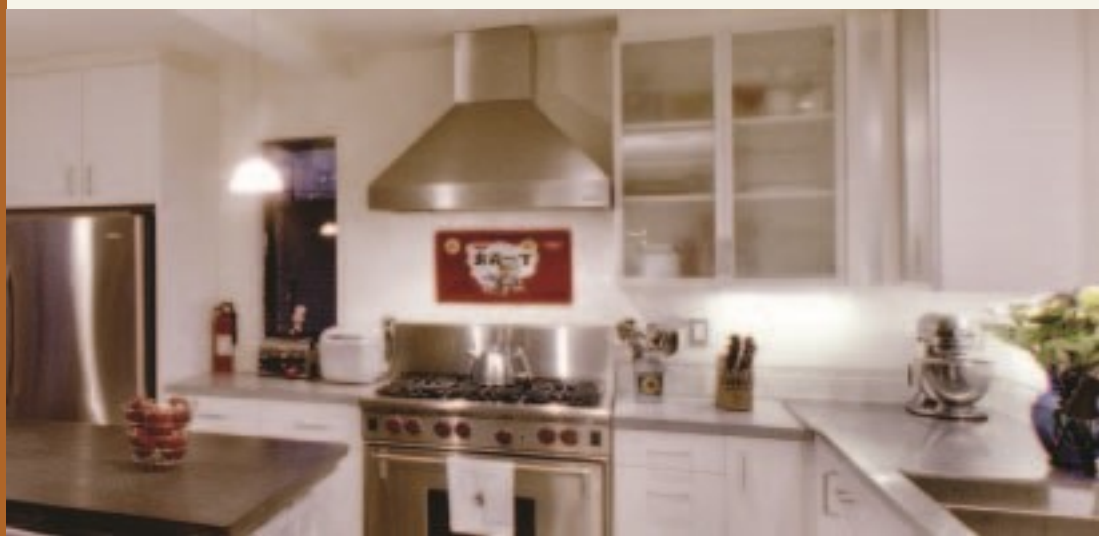
Seattle Public Utilities also creates *reblended paint* from leftover paints brought to Household Hazardous Waste facilities, available through the Seattle Public Utilities Reuse Store. Suitable for indoor or outdoor use, this paint comes in a limited color palette and is offered free of charge on a first-come, first-served basis. Call (206) 615-0731 for details about the Reuse Store.

If you're not picky about color, you can also take advantage of free or discounted paint from several other sources. The King County Online Materials Exchange at www.metrokc.gov/dnrp/swd/exchange/ provides listings for available surplus paint. Occasionally, you can also find free paint in the *Building Materials* section of local classifieds. Another cost-saving measure? Many paint stores offer paints that were custom tinted and then didn't meet customer specifications. These paints are usually offered at a fraction of the cost of retail. While the price is right, surplus or off-tint paint should still meet your requirements for quality, health and safety.

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.





minimize waste

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. Larger color chips give you a better sense of the paint in your space. Undamaged color chips can be returned to the store for reuse when you go to purchase your final selection.

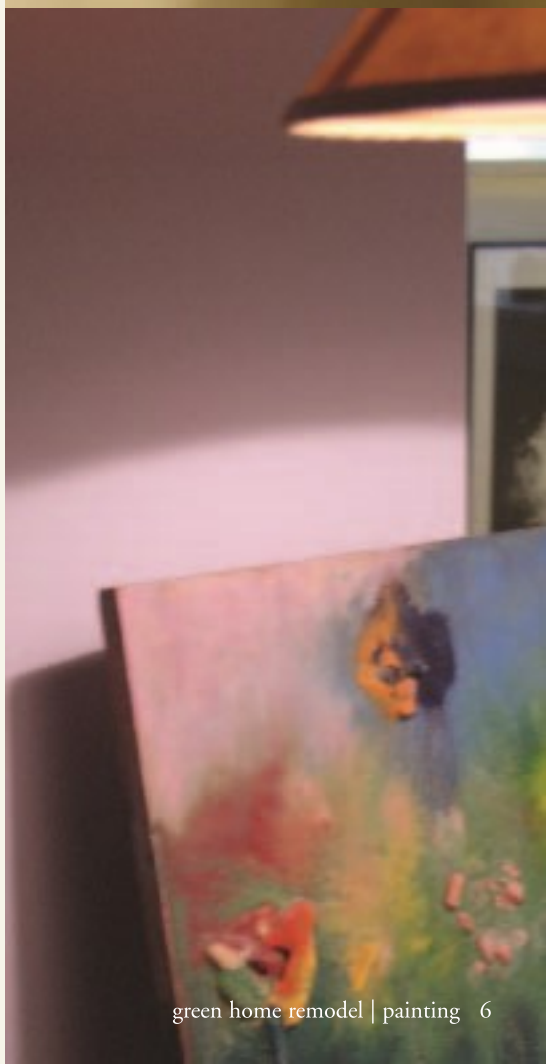
Some paint manufacturers offer virtual paint selection online, where you can preview a room in the colors you're considering. Of course, this doesn't address the specific variables at play in your actual space, but it can give you a sense of what color families you think will work well in your home.

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.

Buy Only What You Need

Unwanted leftover paint is inconvenient and costly to get rid of, 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.

The next step involves estimating the amount of paint you need for your job. 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. King County also provides a calculator at www.govlink.org/hazwaste/house/products/list.cfm (click on *Choose the Right Amount* under the *Paints and Solvents* category).





*Members of the Phinney
Neighborhood Association
have access to an excellent
tool lending library—perfect
for specialty tools or bigger
do-it-yourself jobs. See
www.phinneycenter.org
for more information.*



paint tools

Stroll down the paint aisle at your local hardware store and you may feel compelled to stock up on dozens of paint supplies. A good paint job relies on the right tools, but the toolbox is smaller than the hardware store would have you know. 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, so consider it an investment. If properly cared for, a quality brush can last many years. If neglected, a valuable brush can quickly become worthless. (For tips on cleaning and storing brushes, see *Cleanup and Storage* on page 14.) The type of brush you choose depends on the kind of paint you're using and the job at hand. Choose 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). Here's a water-based paint tip: wet your brush a half an hour before painting to increase its workability.

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. Of course, this confusion can be avoided by choosing water-based paints instead of oil-based products.

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. Another tip for multi-day paint jobs: you can avoid rinsing your roller covers by wrapping them in foil or plastic overnight for reuse the next day.

Photo, above: Robert Harrison Architects.

Drop Cloths or Tarps

Protect floors, heavy furniture and other items you can't easily remove from a room with a drop cloth or tarp. They also can be used to shield plants as well as catching paint flakes and dust when painting exteriors. 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. Old sheets are tempting to use as drop cloths, but leave floors and furniture vulnerable to spills that soak through. Cotton duck canvas drop cloths offer superior performance, and can last a lifetime if properly maintained. They can also be rented or shared—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 are also becoming increasingly popular. In fact, they are 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*.) 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 for your project 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.

For projects not involving lead-based paint, you can often avoid taping around trim and other tight areas with careful painting and good brushes (angle brushes perform best for detail work.) 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.

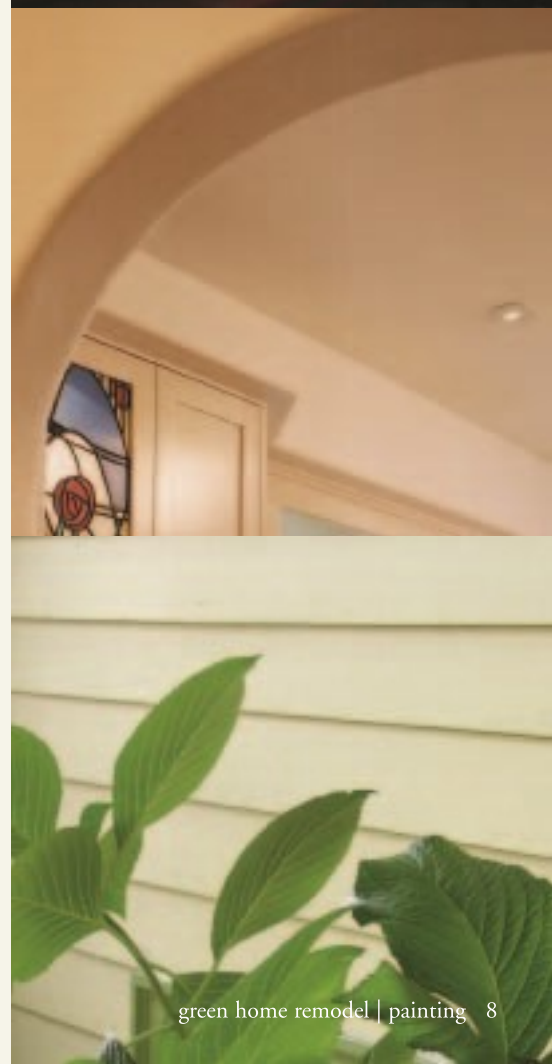
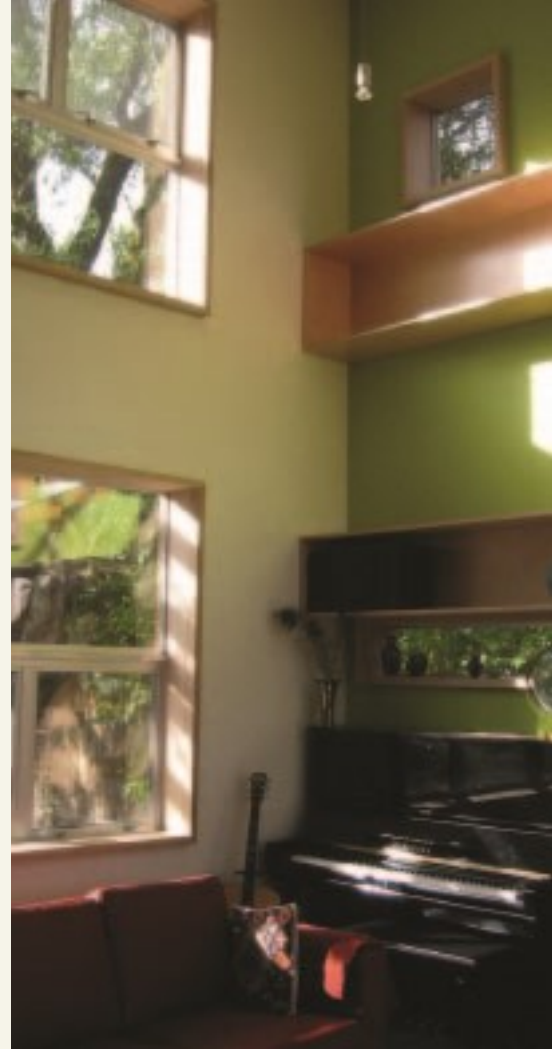
Other Paint Tools

Paint sprayers are sometimes used for larger jobs or where a particularly uniform finish is desired. However, sprayers can waste paint and entail a large amount of cleanup, as well as requiring extra taping and spray protection for both the space to be painted and the painter. Paint sprayers can also be dangerous, injecting paint under the skin and into the bloodstream. Because of these potential hazards, the use of paint spray equipment 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.

Tool Rental and Lending

You can rent many basic and specialized paint tools from home improvement stores and rental services. In addition to freeing up valuable storage space, renting can save money, and definitely conserves resources. You may also have a tool-lending library in your neighborhood. The Phinney Neighborhood Association's Well Home Program includes an excellent tool-lending library, with tools available to association members for a fraction of the cost of renting—you don't even have to be a Phinney resident to be a member. To learn more, go to www.phinneycenter.org and click on *Programs*.

*Photo, top right: Geoff Belau (Silo ARCHITECTURE+DESIGN), and Lauren Woodward.
Photo, middle right: Robert Harrison Architects (photo © Michael Moore).*





preparation

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.



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* 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.

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.

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 (see *Removing Paint*, at right). For general guidelines on how to avoid household hazardous materials, see www.govlink.org/hazwaste/house/ or call the Household Hazards line at (206) 296-4692.

removing paint

Paint removal entails the use of chemicals, abrasion or heat—all of which pose difficulties or hazards. Conventional chemical removers are often highly toxic. Abrasive techniques (sanding, wire brushes, etc.) can release toxic lead paint dust and chips, and even damage wood if improperly used. Heat processes can release lead and other toxic fumes, as well as posing a fire hazard. All paint removal is labor-intensive, making it expensive to contract out; however, do-it-yourself techniques are not recommended, due to the hazards mentioned above. 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. Make sure you really need to remove paint before you embark on a paint-stripping project.

Chemical Strippers

With many paint jobs, it's not necessary to strip old paint—if in good condition, old paint makes a perfectly suitable surface for additional paint. Most paint strippers contain harmful solvents and caustic materials; in fact, they're some of the most toxic consumer products sold. 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.

Scraping, Sanding and Feathering

After cleaning, there will likely be areas where paint has come loose from its substrate. To give the new coat something to hold onto, remove any loose pieces and even lightly sand the area, if necessary. Feathering is the term used for lightly sanding the edges around areas where paint has chipped off or been scraped. This process reduces the visibility of these areas after repainting, and strengthens the bond between new paint and old.

Scraping and sanding produce fine paint dust, which probably contains lead if your home is more than 20 years old. Follow precautions for working with lead-based paint carefully. The U.S. EPA has a variety of resources to help minimize hazards when dealing with lead-based paint; see *Resources* for more details.

Paint Removal Methods to Avoid

Using torches (open flame) is not recommended. The combination of fire risk and health hazard (combustion byproducts of paint and vaporized heavy metals) make torches a dangerous paint removal option. Sandblasting and high pressure washing are also not recommended, due to the likelihood of damage to the underlying surface, as well as the risk of spreading lead-based paint chips and dust. A standard procedure for cleaning, light pressure washing for exteriors is acceptable as long as care is taken to avoid intrusion of water behind siding. (See *Preparation*, page 9.)

Heat guns involve two potential hazards: fire and exposure to toxic vapors. Fire poses a serious risk for building exteriors, such as shingles, where charred wood can smolder in places not immediately visible, then catch fire hours later. Heat guns can also vaporize the lead in old paints, creating an intense inhalation hazard. Other heavy metals, such as mercury, are also easily vaporized when subjected to heat from paint guns.

exterior paint problems & solutions

Paint failures often indicate fundamental problems, such as moisture, improper application, or inadequate surface preparation. They can also be due to using an inferior-quality paint or the wrong formulation for the job. Repainting may temporarily mask these problems, but in order to avoid a future paint failure, you have to address the underlying issues.

EXTERIOR SURFACE CONDITIONS GENERALLY REQUIRING TOTAL PAINT REMOVAL

PROBLEM	POSSIBLE CAUSE	SOLUTION
peeling	excess interior or exterior moisture collects behind paint film, thus impairing adhesion (usually begins as blisters, with moisture causing wood to swell and break paint's bond to base material)	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/ alligating	advanced stages of crazing (see below), with deep horizontal and vertical cracks; surfaces may also flake badly in extreme cases	If cracking/alligating is present only in top layers, scrape and hand- or mechanically sand down to the next sound layer, then repaint. If cracking/alligating has progressed to bare wood and paint has begun to flake, totally remove paint. Prime bare wood within 48 hours then repaint.

EXTERIOR SURFACE CONDITIONS GENERALLY REQUIRING LIMITED PAINT REMOVAL

PROBLEM	POSSIBLE CAUSE	SOLUTION
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. Scrutinize all surfaces for crazing. Although harder to detect than more obvious paint problems, crazing over time can result in deep cracking and alligating—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)	Areas where salts or impurities left on original surface have caused the peeling: scrape section, wash thoroughly, and wipe dry. Then hand- or mechanically sand before repainting. Areas where peeling resulted from using incompatible paints: scrape peeling topcoat and hand- or mechanically sand. Apply a high-quality, least toxic exterior primer that meets the final coat's manufacturer specifications, then repaint.
solvent blistering	paint applied in direct sunlight can cause top surface to dry too quickly, so solvent trapped beneath the dried surface forces its way through the paint film (occurs more with dark-colored paints as they absorb more heat than lighter shades)	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	(1) applying paint too thickly; (2) painting a second coat before the first one dries; (3) inadequate brushing out; (4) painting in temperatures higher than recommended by the manufacturer	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.

EXTERIOR SURFACE CONDITIONS GENERALLY REQUIRING NO PAINT REMOVAL

PROBLEM	POSSIBLE CAUSE	SOLUTION
dirt, soot, cobwebs	lack of regular surface maintenance	Remove with strong spray from a garden hose. For more persistent surface matter, scrub surface with water and a medium soft 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. Sometimes, general cleaning can 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 largest variable determining mildew growth, 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	In small amounts, chalking actually helps create a good surface for painting, as it carries surface dirt and discoloration away with it when rinsed with water. Excess chalking is troublesome, as it can wash onto other surfaces and cause streaking or paint disintegration. 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	First, 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 (unless wood is too fragile). 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 (two primer coats are recommended for severe cases). 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.





Here's a timesaving 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 (making sure to remove air), and then place them in the freezer until you're ready to use them the next day.



painting

After all this preparation, it's time to paint! Follow manufacturer instructions regarding rate of application, air temperature, and ventilation. In the Seattle area, anytime from midsummer 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-VOC, 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.

According to the Environmental Home Center's research, the best way to provide adequate ventilation in a room while painting is to do the following:

- open all windows and doors
- place a fan, blowing *into* the room, in the doorway
- start painting near the window farthest from the fan, working back toward the fan

This method introduces more air into the room than placing a fan so it exhausts air out of the space; it also increases the likelihood that you'll breathe fresh air, by keeping the fumes downwind. For more ventilation tips, go to www.environmentalhomecenter.com and click on *Learn*, then *What is "adequate ventilation?"* section. The Environmental Home Center cautions painters to use a moderate fan speed with this method; too much airflow can cause paint to dry too quickly, compromising its ability to create a strong surface bond.

When painting, keep a damp rag handy for drips and spatters, which are much easier to clean up while they're still wet.

cleanup & storage

Cleanup

Cleanup is a snap if you're using water-based paints—yet another reason to choose these formulas over oil-based varieties. Oil paints require harmful solvents (paint thinners) for cleanup. Because of the associated hazards, always follow manufacturer cautions when using solvents. The safest alternative, of course, is to avoid them altogether.

Water and a mild soap are all you need for cleaning up water-based paints. 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.

The following is a proven technique for cleaning paint tools with a minimum of water use and wasted paint down the drain:

- 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 waste newspaper.
- Fill a container (such as a gallon bucket) with warm water and clean the brushes to remove the majority of the paint.
- 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 brush 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 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 illegal, and bad for the environment.

If dried latex paint on tools resists removal, soften by soaking with vinegar. For more stubborn dried latex, use hot vinegar and soak for an hour or more. Hang paintbrushes and roller tubes to dry. Always remove roller tubes from handles before drying.

Paint Thinners

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. So look for the least-toxic paint thinner that will do the job. Specifically, 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. They can be absorbed through the skin and enter the bloodstream. Unused or paint-laden thinners must be disposed of at a household hazardous waste site (see *Resources*); 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.

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.

Storage

BRUSHES

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.

LEFTOVER PAINT

Store leftover paint in the original can, marked with the date and room it painted. Dabbing a sample of the paint on the lid can also help identify the paint for future use. Here's a painter's trick for keeping a can tightly sealed: place plastic wrap over the can, firmly replace the lid, and store the can upside down. Use a rubber mallet or the palm of your hand to secure the lid; a hammer can distort the lid or can. Store paints in a space separate from your living space, 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. But sometimes you still end up with more paint than you need. Luckily, the Seattle area offers a few options for giving away paint that's still usable. The Household Materials Exchange is one such alternative—a free service that boasts both "wanted" and "available" paint sections at www.metrokc.gov/dnrp/swd/exchange/index.asp

You can also offer free paint through sites such as www.freecycle.org or in the free section of local classifieds. Local performing arts centers may also be interested in your old paint.

Never dispose of liquid paint in the garbage; if you can't find someone to take your extra paint for reuse, drop it off at one of Seattle's two Household Hazardous Waste Facilities. For locations and hours of operation, go to www.seattle.gov/util/garbage/ and click on *Hazardous Waste Disposal*.

You can rinse and recycle empty latex paint cans with other metals at curbside, or at the Seattle Recycling and Disposal Stations; see www.seattle.gov/util for locations and hours of operation. Cans containing small amounts of dried latex paint can be disposed with household garbage.



Learn about Green Cleaning alternatives, including homemade cleaning recipes, by visiting www.seattle.gov/util and clicking on Garbage, and Reduce Garbage & Litter.



maintenance

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 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 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 *Ventilating Fans* in the *Heating and Cooling* portion of the *Products* section.

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 rainy Pacific Northwest. Check the quality of your roofing to avoid potential leaks, which can cause ceiling and wall stains, as well as substantial invisible damage. If you're considering a new roof, see the Green Home Remodel guide on Roofing, available by calling (206) 615-0731 or going to www.seattle.gov/sustainablebuilding and clicking on *Green Home Remodel*.

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.

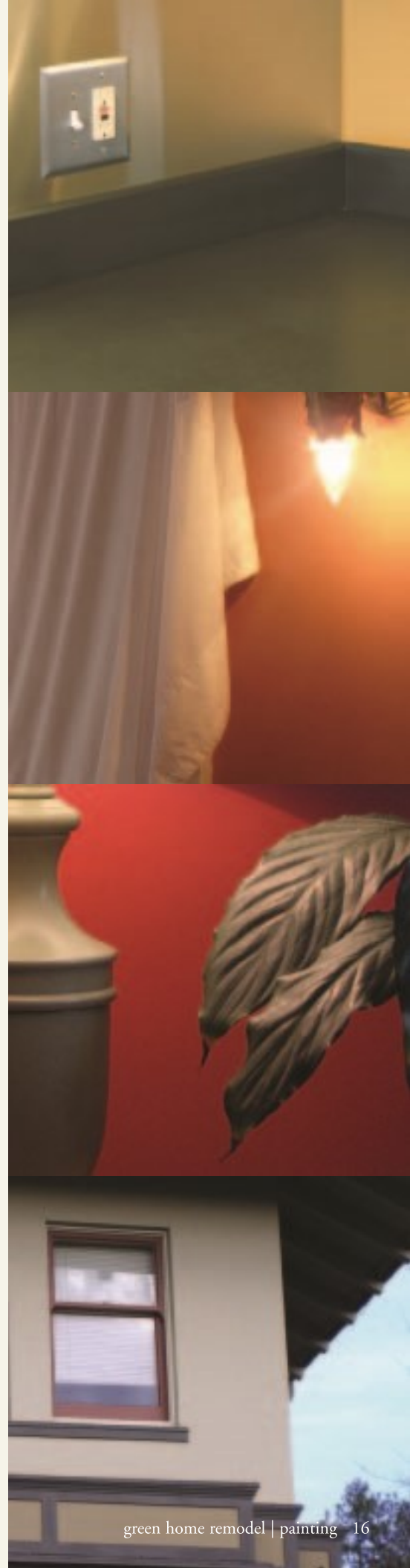
Websites

- For an extensive list of web links and resources related to paints and painting, see this guide's companion Resource list at www.seattle.gov/sustainablebuilding (click on *Green Home Remodel*, then *Painting*).
- National Paint and Coatings Association offers consumers information about lead-based paints at www.paint.org (click on *Consumers* and select from menu).
- Washington Toxics Coalition provides information on paints and finishes at www.watoxics.org (click on *Toxics in the Home* and then *Building Materials*).
- 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.



This brochure was developed by the Seattle Public Utilities Sustainable Building Program, with the assistance of Seattle Public Utilities Resource Conservation staff.

This information can be made available on request to accommodate people with disabilities and those who need language assistance.





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