Stain Removal

Stains disfigure clothes and home furnishings, and it is desirable to remove them, especially if the stains stiffen or corrode the fabric beneath them. However, the removal of stains can be hazardous to the fabric - and to the person attempting to get the stain off. To be successful, care and caution must be exercised.

Old Stains There is often the effect of time upon a stain: the older the stain, the harder it is to remove. Drycleaners who are trained in stain removal prefer to work on fresh stains which have not had time to "set" or react with the fabric, dyes, finish, or atmosphere. Generally, a stain less than two months old can be treated; a stain one-day-old is easier than one that is two-weeks-old, etc.
Perhaps the most distressing example of ageing is the soda or cola beverage stain which does not appear to stain but left untreated turns brown because the sugar syrup caramelizes (oxidizes) with time or heat.

Type of Stain There are two fundamental types of stains: those that are water-based and those that are oil-based. Coffee or tea exemplify water-based stains. Paint, lipstick, adhesive stains are classified as solvent-based stains, so are latex type paints or Elmer's glue, which contain water initially, and harden to a different, non-aqueous compound. Water-based stains, including most food stains, are acidic and will require an acid mixture to remove them. Oil type stains will need non-aqueous or "dry" chemicals (hence the term "dry-cleaning") in most instances. Many stains, like sebum ("ring around the collar"), and smoke damage, are complex mixtures of oily-type components with water-based salts, acids or bases and particulate matter (carbon, dirt). Inks especially ball-point and felt-tip pens contain complex mixtures, along with pigments (colored particles) and dyes (water soluble, fiber absorbed colorants). Perspiration may be acidic or basic depending on the person. The residue is complicated by the composition of the deodorant or perfume used. Pet stains are also variable and complex. Vomit mixes bile from the digestive process with the foodstuffs themselves. Cat urine is not comparable to human urea, as it contains a sulfur molecule. Each is broken down and removed by enzymatic actions specific to the molecular structures. Other types of stains that require special chemical reagents are: dried aged blood, and food colorings like Kool-Aid®.

Condition of the Fabric Water swells natural fibers but not polyester or acrylic, so a water-based stain will go deeper into a natural fiber unless a special hydrophobic (water repellent) finish has been recently applied. Polyester or acrylic, in contrast, will repel water-based stains but adsorb oily ones unless a special finish has been fixed on those fibers. Consequently, the success of a stain removal method depends upon the fiber type and finish.
Some dyes and finishes are set on the fibers in the same manner the stain is: with salts, with acids, with warm temperatures, and with time. The chemical compounds that give color to food can be very similar - even identical - to those colors found in shirts, blouses, or oriental carpets. Older fabrics loose their resistance to tearing, to stretching, and to rubbing. Removing a fresh stain from an old textile may require too much stress on the fabric and leave a rip where there was only discoloration before. Thus, many drycleaners and conservators are reluctant to risk this additional damage to an old textile.

Stain Removal Supplies 100% cotton swab, absorbent paper or cloth toweling, a clean non-porous working surface (a formica or glass table top), deionized water (for steaming iron), bright lighting, peace and quiet, patience.
Stain removal requires an appropriate work area and appropriate supplies. Generally, it is better to set aside a problem for a quiet morning than to attempt to correct it in the midst of a party or dinner, beyond soaking up excess liquid or dabbing up excess solids (in the case of ketchup, mustard, vomit, mud).
Any treatment should be applied by tamping (up and down) with a

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small cube of sponge or cotton ball or by rolling with a cotton swab across the stained area. The stain should never be rubbed because this can abrade or rip the fabric. Stain removal is sequential and repetitive, because removal involves taking off a percentage of a stain with each application. It is important to confirm the stain or discoloration by limiting the amount of reagent liquid to a small area, flushing that small area clean onto a disposable, absorbent toweling, and then reapplying the reaction liquid. To remove 100% of the stain, even with an effective reaction liquid, five to seven reapplications of the same sequence may be needed because of the chemical reactions to the stain in the fiber can be complex and time dependent. As long as a portion of the stain is being removed, the reaction sequence should be repeated. If you haven't the knack for such work, lack the space, time or quiet, you can ask a dry-cleaner to treat the stain without his washing or dry-cleaning the entire textile afterwards.
Stain removal can involve solvency (dissolving the stain), detergency (putting the stain into suspension), saponification (using the stain to make a water soluble soap), bleaching reaction (oxidizing or reducing the stain to decolorize it), breaking the molecule apart with specific enzymes.

Water-based Stains (Coffee, Tea, Fruit Juice, Fruit) If the condition of the fabric --fiber, weave, dyes, finish--is good, then these water-based stains can be removed, if the stain is fresh. These liquids contain tannin and other acids. A small amount of diluted shampoo (one with no conditioner, no perfume, no color) or dishwashing liquid (same re-strictions) can be alternated with applications of white vinegar, a mild acid. Here you are using "like to dissolve like" and detergency to carry away an acidic foodstuff. Be sure to rinse well with the deionized water, to blot and to dry the area.

Cola, Wine, Beer, Liquors contain alcohol, sugars, tannins, in water. Glycerin (a water soluble glycol) can lubricate (solvent action) the stain, especially red wines like Burgundies. Glycerin should be rinsed out with water; the tannin/acid portion of the stain is removed with application of white vinegar and dilute shampoo (see water-based stains above).
Egg, Ice Cream, Milk, Vomit contain proteins and complex chemical compounds. Rinse with cold water if possible. If not, allow the stain to dry and then brush the solids gently off as much as possible. This will reduce the amount to be treated. Generally, enzymatic action is used to break down this type of stain. Some success may be found by using a dilute shampoo followed by dilute ammonia (an alkali). Silk and wool themselves are protein fibers and can be damaged by protein enzymes or alkali.

Salad Dressing, Gravy, Grease The oily part can be dissolved by dry-cleaning solvent (perchloroethylene; 1,1,1 trichloroethane). After these solvents have evaporated, the residue can be removed with mild shampoo (detergent action), followed if necessary by dilute shampoo with dilute ammonia. Alternatively, the oil can be reacted with a poultice of washing soda (sodium carbonate) and *warm* water. This poultice saponifies the oil into a soluble soap which can be rinsed off. If the oily stain has oxidized (turned yellow), this method will not work.
Inks are best treated first with solvents and then with water-based reagents. Effective solvents may be acetone, ethanol, or dry-cleaning spotting agents. When these have each been used separately and sequentially, (i.e. each evaporated off before the next is employed), then water-based treatment can follow, using a mild shampoo and white vinegar lubricated with a little glycerin. Because of the amount of work time involved and the number of reagents, it may be wise to consult a dry-cleaner.
Paint, Plastic Resins may require dry-cleaning solvents preceded by reagents soluble in these solvents. Because of the special ventilation and safety requirements, it is preferable to consult a drycleaner.

Cat Urine Do not use ammonia. Porous absorbent surfaces like fabrics can be treated with enzymes available at the veterinary; dyes or finishes of the fabrics may be affected by either the urine or by its removal agents. Test a small area.

CAUTION
Acetone (nail polish remover) and **amyl acetate** are effective in removing lipstick, nail polish, by dissolving the lubricant carrying the pigmented color. However, these will dissolve cellulose triacetate

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fabrics (including the linings of ties) into a plastic pulp!
Ammonia or **Alkali** will react with acidic foods to make a permanent salt (i.e. a permanent stain).
Chlorine Bleach ("**Clorox®**") will dissolve silk or wool--these fabrics will disappear! Cotton or linen will be bleached initially; with time, the fabrics will yellow slightly and weaken. It's more damaging than hydrogen peroxide.
Hot Water will set stains, but has been used to "push out" a stain by swelling the fiber by pouring boiling water from a height onto fruit-stained cotton fabric (not a recommended method).
Club soda contains salt and carbonic acid (**Seltzer water**); the salt may set the stain (see below).
Hydrogen Peroxide is an oxidizing bleach with a limited action time. Used with sodium bicarbonate (baking soda) as a poultice; may decolorize some dyes; will slightly weaken fibers.
Lemon Juice is acidic but cannot be left in. Remove it with white vinegar.
Oxalic Acid (rhubarb leaves, etc.) will act slowly on oxidized iron stains (rust) but can damage cotton, linen. More effective but more hazardous (to people) methods are used by dry-cleaners in controlled circumstances.
Perborate ("**Clorox II®**") becomes activated at higher temperatures and releases hydrogen peroxide (see above) as the active ingredient.
Salt is sodium chloride; it will set tannin stains (wine, coffee, juice).
Water will weaken silk or wool. These fibers will stretch more easily, tear more readily in water. Cotton or linen will be stronger in water, but if they are aged or already damaged, they can be torn also.
Wax from candles can be absorbed into paper towels if the fabric is sandwiched between the papers and a hot iron is applied to the paper, but this can dye the fabric with the color of the wax—if the fiber is polyester/cotton.

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