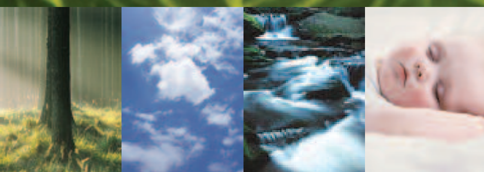
A clean home.
A healthy family.
A safer world.™



The Seventh Generation Guide to a Toxin-Free Home

seventh GENERATION®

Seventh Generation markets and distributes non-toxic, environmentally friendly consumer household products to natural food stores, supermarkets, and mail order catalogs in the United States and Canada.

The Seventh Generation Guide to a Toxin-Free Home

Part 1: Understanding what's toxic

Introduction

Few products typify American consumerism as well as household cleaners. Capitalizing on our insecurities, manufacturers and marketers have transformed a mundane collection of products into over an $18 billion market of household helpers. We're constantly told we'll humiliate ourselves if our toilet bowls and counter tops don't sparkle as well as our neighbors' do.

Marketing hyperbole aside, modern cleaners are significantly more effective than their predecessors. Synthetic cleaning agents, anti-redeposition agents, bleaches, builders, enzymes and optical brighteners have produced a generation of products that work under more varied conditions, against more forms of dirt, in colder water, and with less time and effort than ever before. But in our attempts to get our clothes whiter than white and homes cleaner than clean, we've accepted a plethora of chemicals whose presence in our homes raises very serious health and environmental concerns.

What happens when I use traditional cleaning products?

More than you might realize! Today's cleaning products are made from an eye-opening number of surprisingly toxic chemicals. When we use these products in our homes, the chemicals they contain can stay suspended in the air for hours or even days after the product has been used and can easily be inhaled. These chemicals also remain behind as residues on surfaces to which the cleaners have been applied. In this way, they can be easily absorbed through any skin that comes into contact with those surfaces. In addition, when chemicals from different cleaners accidentally come into contact with each other, they sometimes react to form new toxic substances. Or this mixing can magnify the potential health effects that are caused by either or both of the chemicals alone. The results of all this chemical chaos can be deadly.

A 15 year study in Oregon, comparing women who didn't work outside the home with women who did, found a 54% higher death rate from cancer in the women who stayed at home. The study suggested that chronic exposure to cleaning products played a role.

Each year there are 5 to 10 million household product poisonings reported—mostly of children.

With all these chemicals in our homes, it's no wonder that the EPA found the air quality in our homes to be 5 to 10 times more toxic than the air outside and typically contaminated by anywhere between 20 to 150 different pollutants in concentrations 10 to 40 times those outdoors. Much of this pollution comes from petrochemical cleaners.

Don't product labels warn me about hazardous ingredients?

Unfortunately, the answer is no. Though cleaners are the only household products regulated by the Consumer Product Safety Commission under the Federal Hazardous Substances Labeling Act, they're not required to reveal their ingredients. These ingredients are considered "trade secrets" and government regulations are designed to protect this proprietary information rather than human health or the environment. In short, no one but cleaner manufacturers really know exactly what is in these products. The consumer has little to go on beyond the warning labels manufacturers are required to put on their products. Though mandated signal words like DANGER, WARNING and CAUTION give us a very general idea about the overall seriousness of the unknown substances the products contain, they do little more than that. In fact, a New York Poison Control Center study found 85% of product warning labels to be inadequate.

Furthermore, these warnings only apply to the immediate health effects a product causes and don't address what really happens when we use these cleaners regularly in our homes.

When is something toxic and when is it not?

An examination of the issue of hazardous chemicals hiding in common household products starts with this simple question. And the answer may surprise you because the toxic potential of any given material is not so much a matter of what it's made from but rather how much of it to which you are exposed.

For example, during the 18th century, a pale complexion was considered attractive and a sign of good breeding. Tanning salons were definitely "out." To achieve their pallor, the members of King Louis XVI's court took arsenic, perhaps weekly. Although we consider arsenic to be highly toxic, neither King Louis nor his wife, Marie Antoinette, died of arsenic poisoning. In fact, some level of arsenic in the diet is still considered necessary for good health!

In contrast, many beneficial chemicals have caused death. Aspirin, one of the safest and most versatile medicines known, poisoned countless children before packaging laws were enacted. Table salt is a common part of our daily diet, and an adult would have to ingest close to a half cup (400 grams) to receive a fatal dose. Yet, an accidental substitution of salt for lactose in baby formulas has caused fatal poisoning.

What, then, makes a chemical a poison? One answer is quantity (acute toxicity). Another is time (chronic toxicity). When it comes to acute toxicity (or sudden death from exposure to a chemical), it is the amount needed to induce sudden death that determines whether a chemical is considered poisonous or not.

Safe doses are measured by a statistical standard known as Lethal Dose (LD). The LD standard is a useful tool in determining the toxicity of a particular chemical, but is unfortunately largely derived from tests conducted on animals.

(Because this issue is important to us, we'd like to pause here to note that Seventh Generation neither conducts nor approves of animal testing under any circumstances. We believe there are better and far more humane ways to measure toxicity, and we employ these alternative methods when testing our own products. However, both the scientific community and the cleaning products industry as a whole rely on the LD standard almost exclusively, a fact which means that no one has ever created an alternative set of similarly comprehensive, animal testing-free data. Because the LD standard is the only way to illustrate several crucial points, we're forced to use it here in spite of our reservations. The good news is that this will only take a moment or two.)

The LD standard is based on a benchmark called the LD50. The LD50 is the quantity of a chemical needed to kill 50% of the animals in a test group (usually mice or rats). Because larger animals require larger doses of a chemical to exhibit toxic effects (i.e., it takes more arsenic to kill an elephant than a mouse), the LD50 is measured as the weight of chemical in milligrams (or mg) per kilogram (or kg) of animal weight needed to cause death.

For example, the LD50 of arsenic trioxide (a common form of arsenic), when measured in rats, is 15 mg/kg. This means about 15 mg (approximately one-half of one-thousandth of an ounce, or 0.0005 ounces) would be needed to kill a 1 kilogram (2.2 pound) rat. By comparison, 3,000 mg (approximately a tenth of an ounce, or 0.1 ounce) would be needed to kill a 200 kg (440 pound) gorilla.

The LD50 of aspirin, measured in rats, is 1,500 mg/kg. This means 1,500 mg (0.05 ounce) would be needed to kill a 1 kg rat, and 300,000 mg (10 ounces, over half a pound) would be needed to kill the 200 kg gorilla. The LD50 of table salt (also measured in rats) is 3,750 mg/kg. At this rate, it would take 750,000 mg (nearly a pound and a half!) of salt to kill the same gorilla.

What's important to note is that it takes 100 times more aspirin to show acutely toxic effects in a given animal than arsenic trioxide. In other words, arsenic trioxide is 100 times more toxic than aspirin. It takes more than twice as much salt to kill an animal as aspirin. Thus, salt is less than half as toxic as aspirin. Confused? Don't be. Just remember that almost everything is poisonous in some amount. The less of a chemical that's needed to show acutely toxic effects, the more poisonous it is.

Aside from ingestion, other forms of acute toxicity that must be considered for consumer products include inhalation toxicity (especially for volatile, gaseous, and "dusty" substances) and dermal toxicity (for substances that contact our skin).

The Consumer Product Safety Commission (CPSC) defines acute oral toxicity as follows:	
If the LD50 is:	**The CPSC Defines the Hazard as (product would also carry the notice):**
5,000 mg/kg or higher	Undefined
Between 50 and 5,000 mg/kg	Toxic ("Warning, Keep out of Reach of Children")
Less than 50 mg/kg	Highly toxic ("Danger" "Poison")
(Note that by this definition both table salt and aspirin are considered toxic materials. Arsenic trioxide is highly toxic.)	

The cancer/chemical connection: How little is little enough?

Fortunately, we are seldom exposed to sufficiently large doses of chemicals to suffer acutely toxic effects. In most circumstances, a person is regularly exposed to a substance at levels significantly below the acutely toxic level. This is called chronic exposure. Tobacco smoke, present in many homes, contains many toxic chemicals. Most exposure to tobacco smoke does not result in instant mortality because the levels of exposure are below the acutely toxic level. Over time, though, toxic effects are experienced from tobacco smoke. The effects are most visible in smokers suffering emphysema; lung, nose and throat cancer; and other chronic ailments. Nonsmokers who live or work in smoke-filled environments also suffer chronic effects.

Most people who come into contact with the chemicals in our homes and environment do not experience acutely toxic exposure leading to sudden death. They are more likely to experience an array of far subtler symptoms, including headaches, rashes, nausea, and others, which, while less dramatic, can still be debilitating. Compounding this problem is the difficulty of isolating which chemical present in your home, office, or even car is causing the problem.

Measuring cancer risk from chronic exposure to chemicals is no less difficult. The best data comes from occupational chemical exposures that result in unique malignancies. For example, chimney sweeps in 19th Century England developed cancer of the scrotum much more frequently than the general population. We now know this was due to exposure to polynuclear aromatic hydrocarbons in the soot with which they had daily contact. Similarly, lung cancers in shipyard workers implicated asbestos as a carcinogen, as did liver cancers in workers manufacturing polyvinyl chloride (PVC). Incidence among polyvinyl chloride workers of this form of cancer is 3,000 times higher than among the general population.

There are strong links between increased cancer rates and life in the industrialized world, where we are exposed to high levels of suspected cancer-causing chemicals. In Sandra Steingraber's outstanding book *Living Downstream* (see Further Suggested Reading), she documents some powerful information:

- One-half of the world's cancers occur among people in industrialized countries, even though we are only one-fifth of the population.
- Breast cancer rates are 30 times higher in the United States than in parts of Africa.
- The International Agency for Research on Cancer has concluded that 80% of all cancer is attributable to environmental influences (these include lifestyle influences such as smoking, as well as exposure to carcinogenic chemicals).
- During our lifetime, 40% of all Americans will get some form of cancer—50% of men and 30% of women.

Amazingly, only a dozen or so chemicals have been directly implicated in human cancers (for more information on why this is so, read *Toxic Deception*, listed in Further Suggested Reading). Most of the other "suspected" carcinogens have been identified by feeding large doses of these chemicals to specially bred mice and rats. If a chemical produces tumors in one or more feeding studies, it is only considered a suspected carcinogen.

While many, many household chemicals fall into the category of "suspected carcinogen," regulations that might protect us from them remain relatively few and far between. This is so for two reasons:

First, it is difficult to apply the results of animal studies (which measure high levels of exposure for short periods of time) to real-world human exposures (which typically involve low levels of exposure for long periods of time). Because chemicals can cause different effects in the body depending on the dose and length of exposure, using short term animal studies to predict long term human outcomes is often an exercise in futility. Such studies simply don't accurately reflect the way ordinary people actually use and are exposed to most chemicals. They do a good job of telling us what will happen when we experience a lot of exposure over a little time but not a little exposure over a lot of time. We may, for example, know if you ingest a pound of chemical X in a single sitting, you will sicken and die. But what happens when you're exposed to just a few thousandths of a gram of chemical X every day for many, many years? The study that told us what will happen in the first case simply cannot predict what will happen in the second.

Developing research methods that can accurately predict real-world human consequences of long term, low-level exposures to particular chemicals is an inherently daunting task for a simple reason: the longer the study period, the more potential risk factors are introduced. As time passes, it becomes harder and harder to say with certainty that chemical X is responsible for condition Y because so many other variables, identified and unidentified, have likely entered the picture and created health effects of their own that interfere with the study's results. At a certain point, separating these unwanted factors and their effects from effects of the chemical one actually wanted to study in the first place becomes virtually impossible.

There is also the very serious issue of research ethics. Irrefutable evidence of human health effects from exposure to specific chemicals can only truly come from one source: tests on human beings over long periods of time, and clearly such tests are out of the question.

Because they cannot be conducted on humans and because they suffer from built-in imperfections, those studies that do attempt to gauge long term, real-world health effects are often easy to dispute, and this brings us to the second reason for the relative absence of strong consumer protections and other chemical regulations: the power of the chemical industry itself.

Whenever the test results do manage to come close to suggesting a certain chemical is dangerous enough to be removed from the market, the chemical's manufacturer is likely to spend millions of dollars challenging the research and any potential regulations based upon it. Take, for example, the case of dioxin. Industry lawyers and lobbyists have claimed that even though hundreds of tests and studies indicate that dioxin is a very probable cause of cancer, we still don't know for sure because no actual tests were done on humans! The result is that while most of Europe is satisfied with this 99% level of certainty and has stopped bleaching paper with chlorine because of the dioxin the process creates, we continue to use chlorine here in the U.S. The 1% of uncertainty that remains has been enough to quell regulations here. In fact, the Chlorine Institute, an industry lobbying group, admits that it spends approximately $150 million a year fighting anyone and everyone who challenges the safety of this chemical!

Natural, organic and synthetic: What's the difference?

When it comes to understanding household chemicals, this is a crucial question, and a point about which people are often understandably confused.

All matter in our universe is composed of atoms. There are approximately 110 types of atoms, or elements. Ninety-two elements occur naturally, and just 10 elements account for over 99% of the things we enjoy on Earth. One of those elements, carbon, is uniquely associated with life. Hence, chemical compounds containing carbon are called organic chemicals.

In the 19th century, humankind began to make its own chemicals using carbon. Although they did not occur in nature, these human-made compounds of carbon were still called organic chemicals. They are "synthetic organic chemicals," rather than "natural organic chemicals," which is an important distinction.

Synthetic organic chemicals: A short history, Part 1

Hundreds of millions of years ago, Earth was covered by oceans filled with millions of tons of tiny plants and animals. As these plants and animals died, they settled to the bottom of the oceans and were covered by thousands of feet of sediment and rock. Over millions of years, heat and pressure turned the layers of dead plants and animals into a viscous, black material we call petroleum or crude oil. Petroleum consists of many long chains of carbon atoms with hydrogen atoms attached. These long chains, called hydrocarbons, do not have much use. But when they are broken into shorter chains, we get materials like ethylene (a building block for synthetic detergents and plastics), propane and butane (petroleum gases used as fuel), gasoline, diesel fuel, heating oil, and lubricants. This process of breaking the long chains of petroleum into shorter chains is called cracking.

Once petroleum has been cracked, all the products are jumbled together. They have to be separated, and this is done by boiling the mixture of chains. Because each product boils at a different temperature, it separates from the mixture at different times as the temperature of the boil gradually increases. Once released, the product, whether gasoline or ethylene, is captured and condensed back to a liquid state. This process is called distillation, and it produces surprisingly pure products called, cleverly, "petroleum distillates."

Petroleum distillates can be used without further processing. Liquid petroleum gas (LPG), gasoline, diesel fuel, and heating oil are petroleum distillates used to produce energy. Similar products, called naphthas, Stoddard solvents, or just plain old petroleum distillates, are used as solvents on greases and tars that will not dissolve in water.

In addition to the toxic nature of the products petroleum produces, our reliance on this material causes a host of environmental problems in and of itself. Petroleum pollutes the environment when we drill for it, when we transport it (oil spills average 2.6 million gallons a month), and when we refine it (refineries release 492 million pounds of hazardous volatile organic compounds and over 71 million pounds of toxic air pollutants into our air and water each year). Every time we use a petrochemical cleaning product, we contribute to this pollution. And, we further deplete an important global resource whose supplies are expected to become scarce around the year 2050.

Synthetic organic chemicals: A short history, Part 2

While many chemicals are derived from petroleum, another major branch of modern materials science revolves around another raw material. Around 1900, Herbert Dow, the founder of Dow Chemical, split common salt to make commercially valuable sodium hydroxide. In the process an unwanted byproduct was released, a highly toxic green gas called chlorine. Mr. Dow, a chemistry teacher, soon began experimenting with this gas and combining it with other elements, thus creating "chlorine chemistry." This new chemistry gave rise to solvents, pesticides and many other useful but toxic chlorinated compounds. A prime characteristic of chlorinated chemicals is the strength of the bond created between chlorine and other atoms. While this bond makes chlorine a valuable element for chemists building new substances, it is also one of the keys to understanding why chlorine is so dangerous. Once bonded with another atom, the molecular toughness of chlorinated compounds means they last a long time in the environment and are very difficult to break down.

Today, there are about 15,000 chlorinated chemicals in commercial use. Only very few have ever been completely banned, but these few are some of the most notorious substances ever invented. For example, the chlorinated hydrocarbons polychlorinated biphenyls (PCBs) were once used in electrical transformers in place of petroleum oils, which often burned. But scientists in the late 1960s discovered that the chemical was extremely persistent in the environment and, worse, was accumulating in human beings and responsible for very serious health effects that included cancer and birth defects. Production of PCBs was halted soon thereafter. In 1939, the now banned chlorinated hydrocarbon, DDT, was introduced as an insecticide and miracle malaria preventative. When Rachel Carson wrote *Silent Spring*, she accurately predicted the environmental devastation that DDT in particular, and the chlorinated hydrocarbons in general, would bring. In the 1970s, chlorinated hydrocarbons would be identified as suspected carcinogens and implicated in the environmental devastation that turned now infamous communities like Love Canal and Times Beach into hazardous waste sites.

In more recent times, a growing body of evidence has emerged to suggest that chlorinated compounds are responsible for an ever expanding number of human ailments, including growing numbers of different cancers, reproductive and developmental disorders, and the disruption of the endocrine, or hormonal, system in human beings. (For more information, read *Our Stolen Future*, listed in Further Suggested Reading.)

More chemicals than we know what to do with

Approximately 85,000 chemicals are in use today. According to the Breast Cancer Fund, complete toxicological screening data is available for only 7% of these chemicals, and more than 90% have never been tested for their effects on human health. In 1995, the National Toxicology Program concluded that based on the tests they had conducted, something like 5% to 10% of all chemicals in production could be expected to be carcinogenic in humans. That translates into 4,250 to 8,500 different chemicals, almost all of which have yet to be regulated yet alone even identified by the government.

One of the best ways that citizens can protect themselves and their communities from dangerous chemicals is by studying the Toxic Release Inventory (TRI), the key to the Emergency Planning and Community Right-to-Know Act (EPCRKA), passed by Congress in 1986. Unfortunately, the TRI only tracks 667 chemicals (including 30 chemical categories), which make up less than 1% of all chemicals in production and use. Still, many highly toxic compounds are reported in the TRI, and looking at the annual TRI report (available at http://www.epa.gov/tri/) is the best available way to find out which are present in your community.

What makes an ingredient undesirable?

Now that we have some history under our belts, it's time to look at the ways in which the chemicals we've been discussing affect the environment and human health. There are several criteria that are used to evaluate ingredients in specific products, and thus the environmental safety of the products themselves. Any analysis of product ingredients should look at their potential effects in these areas:

1) Air quality/atmospheric impact

The manufacture, use and disposal (especially through incineration) of many common consumer products cause the release of a variety of hazardous chemicals and compounds into the air and atmosphere. These releases may include direct introduction to the air via intentional use and indirect introduction of toxic materials and harmful byproducts during the manufacturing process. Evaluations of products and ingredients should examine their potential contributions to:

- Global atmospheric ozone loss
- Acid rain
- Global warming
- Air pollution

2) Water impact

Use of specific products can directly and indirectly affect ground water, aquifers and bodies of water, from streams and ponds to oceans. This in turn affects all life, from insects and fish to humans. Contamination can occur during consumer use, manufacturing, or when a given product is emptied into a public or private sewage system after use. Evaluations of products and ingredients should examine their potential contributions to:

- Water pollution
- Eutrophication

Eutrophication is a naturally occurring process by which lakes, small streams and wetlands become dry, fertile land for forest growth and animal habitat. Normally, this process takes thousands of years and is part of a sustainable cycle. Eutrophication occurs when excessive plant growth, including the growth of algae, takes place in a given body of water. When the plants and algae die, they settle to the bottom of a lake, slowly filling it and becoming a food source that allows other microorganisms to flourish. As these other microorganisms thrive, they need oxygen to digest this food. As they consume and remove oxygen from the waters, less is left for the fish and other life forms living there, most of which then die en masse. These fish kills can be caused by either natural or man-made events. From the perspective of household products, eutrophication is a concern when those products contain ingredients, like phosphates, that promote the rapid and unnatural plant growth that starts the eutrophication process.

3) Land impact

Consumer products and specific ingredients can also contribute to land-based environmental concerns. These impacts can be caused by raw material and resource extraction, and by manufacture, use and disposal of a given product. Evaluations of products and ingredients should examine their potential contributions to:

- Resource depletion
- Deforestation
- Loss of habitat and biodiversity
- Soil contamination
- Landfill space consumption

4) Human health

Common consumer chemicals and products can dramatically impact human health at any stage in their life cycle, from manufacture to use and disposal. Of particular concern is the effect any ingredient or product has on the user and any effect on the general population caused by accumulation in either household or external environments. Evaluations of products and ingredients should examine their potential to cause:

- Acute toxicity
- Chronic toxicity

Acute toxicity is any immediate health hazard caused by contact with a product or chemical ingredient. Symptoms of acute toxicity can range from simple internal or external irritation to intestinal distress, convulsions and even death. Chronic toxicity is any long-term, cumulative negative health effect caused by repeated low-level exposure to either a product or a specific chemical component found in either the household or the general environment. The symptoms of chronic toxicity appear over time and can include asthma, allergies, cancer, endocrine, immune, and nervous system damage; reproductive and developmental disorders; organ damage; and the general condition commonly known as multiple chemical sensitivity (MCS), also known as environmental illness, a condition many scientists believe is a severe body-wide allergic reaction to repeated contact with toxic chemicals.

When considering how product ingredients impact the above areas of environmental and health concerns, it's necessary to better understand an important factor that can have a dramatic effect on their potential to cause damage: biodegradability.

Biodegradability

Biodegradability in household chemical products is desirable for two reasons. First, biodegradability means that the product can be recycled by nature, or broken down into its smallest parts via the action of microorganisms. For example, a piece of paper, made from trees, will biodegrade into carbon dioxide and water. The carbon dioxide and water can then be used by other plants and trees. In a closed system, like a spaceship or planet Earth, this type of recycling is necessary for the system to be self-sustaining.

Biodegradability also means that the product will not be able to stick around and accumulate in the environment. When a chemical does not biodegrade, its concentrations in the environment continue to increase as more and more of the chemical gets added to existing amounts that are themselves not biodegrading. Since toxic effects increase with concentration, an otherwise relatively benign chemical can quickly become a dangerous one if it does not biodegrade and instead continues to "pile up" to unhealthy levels in either the environment or the human body.

These growing concentrations of a chemical caused by a lack of biodegradability are referred to as bioaccumulation. A good example of the effects of bioaccumulation can be found in the pesticide DDT. Like many chlorinated compounds, DDT does not readily biodegrade and instead bioaccumulates. Though small amounts of DDT were initially fairly well tolerated by people and the environment, as more and more of this chemical was used, more and more of it bioaccumulated in the environment and in the fatty tissues of animals. In this way, DDT began to travel up the food chain. Shrimp in certain waters, for example, might have a little bit of DDT in their tissues. When these shrimp are eaten by a small fish, that fish adds the shrimps' collective DDT stores to its own. Over a lifetime of eating, that small fish can accumulate quite a bit of DDT, little of which breaks down. When the little fish and many others like it are eaten by a still larger fish, the larger fish accumulates even greater amounts of DDT. When that larger fish is caught and eaten by a person, all of the DDT consumed by all of the various animals along the way ends up in that person's tissues. Human beings thus receive the bioaccumulated DDT from the entire food chain because we sit atop it.

One idea that is necessary to understand when talking about biodegradation is the importance of the rate of biodegradation. The speed at which a given material breaks down makes a big difference in the bioaccumulation threat it might represent. For example, a chemical that takes just five days to decay is far less worrisome than a chemical that takes five, 50 or 500 years to biodegrade. The bioaccumulation of chlorinated chemicals in mammals, including humans, is now suspected of disrupting sexual development, reproduction, and may other essential bodily functions through a process called endocrine or hormone mimicking.

Many chlorinated chemicals, it turns out, have molecular shapes that are almost identical to specific hormones. In the hormone mimicking process, this similar shape allows these chemicals to slip inside cells in place of legitimate hormones and trigger cellular activity. Telling cells to perform certain functions or behave in certain ways is a hormone's main job, and the body has thousands of kinds of these messengers. But chemicals masquerading as hormones in the body often cause cells to do the wrong things at the wrong times or in the wrong amounts. The result is abnormal cellular behavior and illness.

If these chlorinated chemicals and others like them were biodegradable, they wouldn't present such a threat. They'd be constantly breaking down into harmless parts and would therefore be relatively few and far between in the environment. But, because they don't break down, they threaten to overwhelm the environment and the organisms living there.

The natural balance of planet Earth

A final point to remember: we don't live in isolation. Everything we do affects the world around us. Breathing consumes oxygen and releases carbon dioxide. We consume food and release heat and waste. But having an impact isn't necessarily bad. On a simplified scale, our heat and wastes are necessary for other organisms. Their heat and wastes, in turn, combine with our own and are ultimately absorbed by plants, which then become our food or industrial raw materials. That's the way it should be. The world we inhabit is a beautifully balanced system of profound and complex interactions among all its organisms. The impact each organism has is necessary for this planetary system to work. Unfortunately, humankind has developed lifestyles and industrial processes that disrupt this self-sustaining balance. Our objective now must be to minimize our disruptive lifestyles and replace those industrial processes that threaten the sustainability of nature's cycles with processes that do not.

Part 2: Making your home a safer and less toxic place for your family

1) Breathing easier: Cleaning up indoor air pollution

In the past 20 years, the construction of "tight" energy-efficient buildings has led to a sharp reduction in the amount of fresh air entering our homes, schools and workplaces. At the same time, our buildings have been filling up with fumes from paints, stains, furniture, household cleaning products, and other synthetic materials, and the results are startling. According to research conducted by the EPA, the air inside the average home is typically 2 to 5 times more polluted than the air just outside its walls. One five-year study found that the levels of certain chemicals in many homes were 70 times higher than they were outdoors. Another study examining indoor air quality in six cities discovered that peak concentrations of 20 toxic chemicals were a remarkable 200 to 500 times higher inside than the highest concentrations recorded outside. When the Consumer Products Safety Commission studied air pollution, it found that outdoor air contained an average of less than 10 volatile organic compounds (or VOCs, a type of airborne pollutant) while indoor air contained approximately 150.

This indoor air pollution has many sources. A wide variety of household cleaners and products like window and all-purpose cleaners, paints and stains contain toxic materials called volatile organic compounds (VOCs) that are designed to quickly evaporate into the air to aid drying. Hot chlorinated water, such as that emitted by an automatic dishwasher or a shower, can fill the air with chloroform and other chlorine-related compounds. For up to five years after their manufacture, furniture constructed from pressed composite wood products like plywood or particleboard gives off formaldehyde gas, which comes from the resins used to make these materials. Improperly vented gas stoves and other combustion devices add carbon monoxide and particulate pollution to indoor air. Other common sources of indoor air pollution are aerosol sprays and air fresheners. In homes where these products were used frequently, mothers suffered from 25% more headaches and 19% more depression, and infants under six months of age had 30% more ear infections and 22% higher incidence of diarrhea, according to a study at Bristol University in England that was published by *New Scientist* in 1999.

To reduce the impact of indoor air pollutants, circulate fresh air through your house as often as possible. Use cleaning products made from natural and non-toxic ingredients. When remodeling, ask for low-VOC paints and stains. Avoid the use of spray paint. Purchase furniture made from whole wood. Make sure your furnace, stove, and other combustion devices are inspected and vented to the outside. Fill your home with houseplants, which naturally filter air and provide fresh oxygen.

2) The green clean: Choosing safer cleaning products

The average household contains anywhere from 3 to 25 gallons of toxic materials, most of which are hiding in the cleaners we use. These materials fill the air inside our homes with hazardous fumes and leave unhealthy residues on household surfaces. Unfortunately, cleaning products are not required to list ingredients on their labels so we have no concrete way of knowing how hazardous a particular product is. Instead, we must rely on labels that use words like 'Warning,' 'Caution,' 'Danger,' or 'Poison.' And even then, not all hazardous cleaners will offer such warnings.   In 2000, cleaning products were responsible for nearly 10% of all toxic exposures reported to U.S. Poison Control Centers, accounting for over 206,000 calls, over half of which were about children under the age of six.

To detoxify your house, rid yourself of cleaners that are toxic or that you suspect may be toxic. Do not dispose of them in the garbage; your local Department of Sanitation or Solid Waste can tell you where to take these hazardous household wastes.

When you buy new cleaning products, look for manufacturers that list their natural ingredients on the label and purchase cleaners containing non-petroleum-based surfactants, that are chlorine and phosphate free, that claim to be "non-toxic" and that are biodegradable. These products often clean as effectively as their petrochemical counterparts, but don't pollute your home in the process. Awareness of this issue is growing, and product lines of environmentally sound cleaning products (such as ours!) are available in natural foods stores, online and in many supermarkets. A note of caution: some cleaners may advertise that they are "environmentally sound" but will fail to provide a full list of ingredients. Remember, the manufacturer that gives you the most information about its product is usually a manufacturer you can trust.

3) Clearing out the chlorine in cleaners

Many household cleaners contain hazardous chlorine. This dangerous toxin often masquerades behind aliases such as "sodium hypochlorite," or just "hypochlorite," or in chlorinated compounds that can be identified on product labels by the use of "chlor" in the chemical's name. Chlorine is a dangerous chemical to keep in the house. In 2001, 51,815 household exposures to chlorine were reported to poison control centers, more than any other chemical.

Whether found alone or in a mixture of other chemicals, household products that contain chlorine pose a number of serious health risks. These products typically include automatic dishwashing detergents, non-oxygen laundry bleach, disinfectant cleaners, mildew removers, and toilet bowl cleaners. Breathing in the fumes of cleaners containing high concentrations of chlorine can irritate the lungs. This is particularly dangerous for people suffering from heart conditions or chronic respiratory problems such as asthma or emphysema. And the risks are compounded when the cleaners are used in small, poorly ventilated rooms, such as the bathroom. Chlorine is also a highly corrosive substance, capable of damaging skin, eyes, and other membranes.

Using dishwasher detergents that contain chlorine can pollute the air in your home. Hot water in these machines transfers the chlorine from the detergent to the air through a process called volatilization. Chlorine gases are then released in a steamy toxic mist when the machine door is opened after washing.

Whenever chlorine is used in the home, it typically ends up getting washed down the drain by the person or machine who used it. In this way, chlorine enters the environment. Once there, it easily reacts with naturally occurring organic materials, like rotting leaves, in water and soil to create carcinogenic compounds called trihalomethanes, or chloroform, which poison our environment and harm human health.

Whether you use it for household cleaning or laundry bleaching, replace chlorinated cleaners with safer alternatives. Since chlorine is primarily used as a sanitizing or bleaching agent, such strategies can include the substitution of sanitizing agents made from hydrogen peroxide, and bleaches that use oxygen or peroxide.

4) It's a gas, gas, gas: What you don't know about your carpets can hurt you

What's one of the most polluting elements in the typical home? Would you believe it's the carpet? Carpets are made primarily from synthetic fibers attached to a petrochemical backing material. Beneath the carpet is probably padding made of polyurethane. Often carpets are bonded to the floor with special glues that may contain as many as 120 chemicals, including benzene, toluene and formaldehyde. All of these materials slowly give off toxic fumes as they age. This process is called outgassing or offgassing. While outgassing generally decreases over time and is most hazardous during the first several months of a carpet's life (for example, when you smell that "new carpet smell"), it can continue for years, especially if the house is in a hot and humid location.

Choose rugs made from cotton, wool, jute and sisal rugs instead of synthetic fibers. Do not use glues to affix them. Make sure any carpets you purchase are not treated with stain repellents, mothproofing agents, or any other chemicals. If you do use synthetic carpeting, insist that it is aired out first in the dealer's warehouse for a minimum of a week and ideally 2 to 3 weeks before installation. This will let the peak outgassing period occur outside your home. If this isn't possible, leave the carpet as loosely rolled as possible for as long as possible in your garage before installation.

5) You've been taken to the cleaners by your dry cleaner

The process called "dry cleaning" is not dry at all. Rather, garments are soaked in perchloroethylene (perc), a persistent toxic chlorinated chemical that is highly volatile and has been linked to cancer, birth defects, damage to the central nervous system, and a host of short-term effects such as dizziness, nausea and shortness of breath. While all the perc is supposed to evaporate while clothes are at the dry cleaners, it is often trapped by the plastic bags that wrap the garments and can then outgas for up to a week after you bring these garments home. If you must use a traditional dry cleaner, always air out any freshly dry-cleaned clothing in a remote location like a garage for 3 to 4 days before bringing it into your home.

In the last several years, "wet cleaning" technology has been developed to clean clothes that need delicate handling. The process requires the cleaner to spend less money on equipment and chemicals and more on training store personnel to combine hand washing, spot cleaning, steaming and pressing. The stores use precision washing machines that can clean delicate fabric safely without stressing it. The cleaning agents used at "wet cleaners" are purchased with an eye toward protecting the environment and worker and customer health. Toxic solvents like perc are not used.

6) This time it's personal: Non-toxic personal care products

The average American bathroom cabinet is a veritable chemi-copia of soap, mouthwash, toothpaste, shampoo, and hygiene products. These products contain a wide variety of chemical compounds and synthetic substances, the safety of which remains questionable. In spite of this important point, federal government regulations continue to allow incomplete ingredient disclosure on the labels of many personal care products. The result in these cases is that consumers simply don't know what chemicals they are applying to sensitive areas of their bodies every day.

There are a number of natural products on the market. The best ones will provide a list of ingredients, and most of these ingredients will have familiar names. (Natural soaps, for instance, will contain coconut, corn, soy, canola, or olive oil.)

Of particular concern are tampons, which are made from rayon (highly chlorine-bleached wood pulp) and/or low-grade cotton, which has often been grown overseas and has been treated with DDT or other pesticides. Many tampons are subjected to chlorine-based bleaching. These kinds of feminine care products can expose women to the highly toxic dioxin they contain. The best rule of thumb is to have minimum impact. Unbleached is better than bleached, organic cotton is better than non-organic. Sanitary pads are less invasive than tampons; these also come in non-chlorine-bleached varieties.

7) Baby products with grown-up problems

Out of all the members of our families, the littlest people in our lives need the greatest protection from toxic products because they are at the greatest risk from harm. Pound for pound, babies' and children's higher metabolisms mean they ingest more food and air than adults and so are exposed to higher relative levels of common toxins. At the same time, young bodies have fewer defenses against these toxins because their immune and detoxification systems are still very much under construction. In fact, depending on the organ or system in question, development of these crucial protection systems lasts into the early teens.

Given these facts, it's surprising to learn that many of the personal care and other products designed specifically for children contain the same toxic ingredients as products made for adults. These ingredients include petrochemical dyes, artificial fragrances, harsh alcohols, mineral oils, formaldehyde, talc, and many other chemicals.

In general, the less baby care products you use, the healthier your baby will be. When selecting those products you do choose to use, look for those with all-natural and non-toxic ingredients, and as few total ingredients as possible. When it comes to our kids, simpler is always better! Choose products which contain natural soaps instead of synthetic surfactants, essentials oils instead of artificial fragrances; aloe and herbal moisturizers instead of petroleum jelly and mineral oil, and no dyes, alcohols, parabens, chemicals like quaternium-15 or ethanolamines, or anything else that looks like it might be synthetic in nature. Stay away from fluoride toothpastes because fluoride is poisonous. (That's why such toothpastes have warning labels!). Never use talc or talcum powder products because talc is a mineral that can be contaminated with asbestos; use corn starch powders instead. Choose unbleached or non-chlorine-bleached paper products, wipes, and diapers to keep the threat of dioxin away from your baby.

8) We're not playing around: there's trouble in toyland

The last thing you would expect to be toxic would be a child's toy. Yet, many of our children's toys are manufactured with materials which, if found in a landfill, would be considered toxic waste. Many toys (including Barbie dolls) are made of polyvinyl chloride (PVC), a chlorinated plastic whose production and disposal creates large amounts of highly toxic wastes. More importantly, PVC requires the use of plasticizing chemicals called phthalates to keep it flexible and soft. Recent studies have clearly shown that the phthalate plasticizers in PVC toys are easily transferred to the bodies of the children who play with them when those children put the toys in their mouths or inhale the minute amounts of volatile phthalate fumes PVC products routinely emit.

This news is troubling because recent studies have linked exposure to phthalates to reproductive and developmental disorders, cancer, and organ damage. According to Greenpeace, children are exposed to a variety of these plasticizers via vinyl childcare products like toys. Product testing by researchers showed that phthalates are being used in children's products at levels as high as 33% of some products' total weight. Although the Consumer Products Safety Commission has requested that toy manufacturers cease using polyvinyl chloride, many PVC toys are still on the market.

The best option is to purchase non-plastic toys. That may be seen by some parents as unrealistic given today's toy market, so if you do buy plastic toys, look for toys made from polyethylene or polypropylene, both of which are non-chlorinated. Writing letters of concern to manufacturers that still use PVC is an effective way to ensure safer toys in the future.

9) The 12 most important foods to eat organic

Organic foods are grown and processed without toxic and persistent chemical pesticides and fertilizers. They're sold free of petroleum waxes and fungicides. Emerging research also shows that they likely contain higher levels of important nutrients than conventionally (i.e. chemically) grown foods. In short, no matter how you slice them, organic foods are a better, healthier choice all the way around the plate. According to recent studies, the following specific foods are most likely to be contaminated by unhealthy levels of pesticides and are therefore the 12 most important foods to eat organic:

strawberries
bell peppers
nectarines
cherries
peaches
spinach
celery
apples
pears
potatoes
imported grapes
red raspberries

10) Banish pests without poisons

We use pesticides because they are good at killing pests, but that's their problem: they're good at killing! And the damage these toxic chemicals can cause often extends to human beings as well.

Compounding the problem is the fact that pesticides are not required to provide a complete list of ingredients on their labels. While the active ingredients must be listed, these materials usually make up a tiny percentage of the total volume of the product. Missing from product labels are ingredients like carrier and dispersal agents, and other so-called "inert" ingredients. In many instances, however, these other "inerts" are anything but and are often as toxic as the active ingredients.

A healthy home is one without chemical pesticide products. There are non-toxic alternatives for almost every use of pesticides. Keep food stored in securely closed containers. Use mousetraps instead of mouse poison. Boric acid and pepper sprinkled in the back of cupboards and along baseboards and the inside of crawlspace walls are effective insect barriers. Cedar chips and herbal sachets repel moths in closets and drawers. Outside, plant mint, marigolds, onions or garlic at the border of gardens to keep out unwanted insects. Use the same plants along the walls of your house to keep pests from coming inside. Erect houses for swallows, martins and bats in your yard to keep your property free from flying insects.

11) It's straining cats and dogs: healthier pet care

Just as ridding our homes of toxic products will have a salutary effect on our health, an awareness of toxic chemicals in pet care products can protect our animal friends as well. Flea bombs, collars, powders, sprays and shampoos all contain pesticides – nervous system poisons that are hazardous to animals and humans alike. To make your pet flea-free, try feeding it small amounts of brewer's yeast and garlic. Rubbing its fur with cloves, or citrus, eucalyptus, or pennyroyal oils is another way to repel fleas. Toxic carpets and flooring are much more dangerous to pets than humans because they spend so much time lying on the floor. Replace them if you can. And provide a soft bed that prevents direct contact with floors. Lawn chemicals pose an equally serious problem. Although you may not use them, your pet may encounter them on neighbors' lawns. As you walk your dog or let your cat out, be aware of lawns posted with signs from recent spraying. If your pet encounters a sprayed lawn, thoroughly rinse your pet with clean water as soon as possible.

It is not surprising that most pet food is generally of very low quality and full of chemicals and additives. Like humans, pets benefit from a diet of fresh meat, fruits and vegetables (organic if possible). Unlike humans, your pet will benefit from these foods if they are eaten raw. Studies have shown generations of cats fed raw meat over the course of a decade enjoyed much better health than cats fed cooked meat.

12) Water, water everywhere, but is it safe to drink?

Almost all water that has passed through a municipal water treatment plant has been treated with chlorine and/or chlorine dioxide. This brings several chlorinated pollutants into our homes and bodies every day. One such chlorinated pollutant is trihalomethane or chloroform, which is formed when chlorine combines with natural organic matter in water supplies. Chloroform has been linked to liver, kidney and nervous system damage, as well as cancer. It is also released as a vapor from hot running water, such as in a shower. Metals used in water pipes can bring lead, cadmium, copper, iron and zinc to our taps.

Filters can remove some, but not all, contaminants in water. To determine which type of filter is best for your needs, you first should check with your local water department to determine what pollutants are in your water source and what treatment the water receives from the municipality. There are many less-than-scrupulous vendors of water filters; look for the one that gives you the most information.

Buying bottled water is no guarantee of purity. Regulations governing bottled water are inconsistent from place to place. The better bottled water is in glass (plastic leaches chemicals into water) and lists the source of the water and what treatment, if any, is performed before bottling.

13) Ensure your dreams aren't nightmares: Select non-toxic bedding

We spend a third of our lives sleeping, but most people drift off to dreamland each night in a cloud of chemicals. That's because modern mattresses are made of polyurethane foam that has been treated with fire retardants, covered with polyester mattress pads, and finished with sheets treated with formaldehyde for a permanent press finish. Our blankets may be treated as well. Or they might be electric and surrounding us with a potentially hazardous electromagnetic field as we sleep.

The solution to such unhealthy bedding is the same as it is for our cleaners or home furnishings: a return to natural materials. In the last decade, bedding made from cotton and wool (especially futons) has once again become commonly available. One hundred percent cotton sheets—which need ironing—are back in linen stores. Look for "green cotton," which has not been bleached with chlorine or treated with formaldehyde, or better yet untreated organic cotton. Pillows come in wool and cotton, with down or buckwheat straw fillers (make sure straw filler has not been chemically fumigated).

For cold winter nights, there are cotton and down comforters, and cotton flannel sheets. An old-fashioned hot-water bottle placed at the foot of the bed just before retiring works wonders. If you do use an electric blanket, use it only to warm up the bed before you get in it. Once you settle down to sleep, shut it off and let body heat do the rest.

14) Paper peddling: Choosing better paper products

From writing and wrapping paper to bathroom tissue and paper towels, the vast majority of the paper Americans use has been bleached with chlorine or chlorine compounds. When these chemicals react with a natural material called lignin present in the wood pulp from which paper is made, a variety of chlorinated toxins called dioxin are inadvertently created. Dioxin is one of the most toxic materials known and is capable of causing toxic effects at levels hundreds of thousands of times lower than most other chemicals. Like most chlorinated chemicals, dioxin also resists biodegradation and persists in the environment for long periods of time. This allows it to accumulate in the food chain and in human beings. Dioxin is so widespread in the environment that virtually every man, woman, and child in America has it in their bodies.

The solution is the use of unbleached paper, especially in the kitchen where things like bleached paper towels and coffee filters can transfer the dioxin contamination they contain to foods. Chlorine-free paper products do not contribute to the world's burden of dioxin. Another alternative is non-chlorine bleached paper. This paper is typically bleached with safe hydrogen peroxide, an oxygen-based bleach which breaks down into water and oxygen when used and does not create dioxin. Using these safe paper products keeps your home, family, and environment healthier.

15) Fire retardants feel the heat

Polybrominated diphenyl ethers (PBDEs) make excellent flame retardants because they break down when exposed to the high temperatures found in fires. When this breakdown occurs, bromine atoms are released, and bromine is extremely effective at slowing and even stopping the fundamental chemical processes responsible for oxygen-dependent fire. In essence, PBDEs act as built-in automatic fire extinguishers. PBDEs moved into the marketplace in the late 1970s when a related class of brominated fire retardants called polybrominated biphenyls (or PBBs if you can keep all these acronyms straight!) were banned following a contaminated cattle feed scare. Since that time, their use has been rising consistently. Today, approximately 50,000 metric tons of these materials are produced around the world each year, and 40% of this global total is consumed in North America. PBDEs are primarily used in plastics and foams. As the polymers that make up these materials are being combined, PBDEs are added to the mix. The resulting fire-resistant materials find their way into such wide variety of products that it's a challenge even to list all the categories of goods that contain them. PDBEs are found in computers and peripherals, circuit boards, televisions and other home electronics, coffee makers and other consumer devices, household wiring, smoke detectors, carpets, car seating, polyurethane foams like those found in furniture and mattresses, and imitation wood products, just to name a few.

Unfortunately, PBDEs do not chemically bind to the plastics and foams they're used in. Instead, like nuts in a cookie, they remain loose in the final product, completely unattached to or absorbed by anything on a molecular level. These "free floating" PBDEs are able to easily leach out of any materials that contain them. As soon as they do, they make their way to the environment where they've been found in ever increasing amounts in everything from fatty foods to household dust.

This growing contamination is of grave concern because PBDEs are chemically related to dioxin and PCBs, and although they are not yet officially classified as persistent organic pollutants, they exhibit all the trademarks of those fellow toxins: they are extremely resistant to biodegradation and are able to persist in the environment for very long periods of time, they are highly efficient travelers, and they tend to accumulate in animal fatty tissues and move up the food chain.

The most worrisome aspect of this pollution is the ability of minute amounts of PBDEs to disrupt the body's thyroid system by depressing levels of key thyroidal hormones. This depression can have serious health effects for adults including fatigue, depression, anxiety, unexplained weight gain, hair loss and low libido. More troubling still, children born to women experiencing such reduced hormonal levels are more likely to have low IQs. Studies have also linked elevated levels of PBDEs to permanent learning and memory impairment, behavioral changes, hearing deficits, delayed puberty onset, decreased sperm count, and developmental disorders.

Fortunately, there are safer alternatives to PBDEs and many manufacturers are now adopting them, a move that tends to undercut industry arguments that a ban on these compounds would lead to increased fire deaths and injuries. In addition to safer substitutes that include compounds based on organic phosphorous, nitrogen, and inorganic flame retardants, companies are finding that they can design more fire-resistant products simply by keeping flammable parts separated from those parts that create heat and by using materials that are naturally fire resistant in the first place. With these replacement technologies in mind, recent laws have been passed in the European Union and California that will phase out PBDEs in coming years.

During California's phase-out period, legislation will require manufacturers to place prominent PBDE warning labels on products that contain these chemicals. In many cases, these labels will presumably appear nationally as companies forgo separate state-by-state labeling in favor of a cheaper one-size-fits-all approach. However, companies will not be legally required to alert consumers in other states to the presence of PBDEs in their products. In the possible absence of such warning labels, concerned shoppers are advised to be especially leery of electronic devices and products like furniture that contain foams, the two main domestic sources of PBDE.

There are also steps you can take to protect yourself and your family from PBDEs that may already be present in your home:

- Avoid synthetic foams and synthetic foam-filled furniture unless you're sure they're PBDE-free. Choose natural stuffings like cotton and wool fibers instead or buy from companies that have removed PBDEs from their products. IKEA is one company that no longer sells furniture with brominated flame retardants.
- Replace, cover, or reupholster older foam-containing products, especially if pregnant women or children are present in the home. As foam ages, it decays and becomes crumbly. This degradation promotes the release of PBDEs.
- Exercise caution when removing and/or replacing foam padding beneath any carpeting. Carefully clean up any dust left behind.

- Dust your home regularly and cautiously. Household dust has been found to be a prime migratory destination for PBDEs that leach out of plastics. When dusting, use damp cloths so that dust is captured and removed rather than simply being stirred back into the air.
- Use a HEPA filtration vacuum cleaner on floors.
- When buying new electronic products like computers and home entertainment systems choose components made by companies that do not use PBDEs. Companies that are currently phasing out PBDEs or have stopped using them entirely include computer chip maker Intel, Philips Consumer Electronics, Sony Electronics, Motorola, IBM, and Apple Computer. Consumers are encouraged to contact any company whose products they are unsure of to ask about PBDE use.

Part 3: Protecting Your Community

Toxics Right-to-Know Campaigns

We're kept in the dark.

Americans remain largely in the dark about millions of pounds of toxic chemicals being used, shipped, discharged and spilled in our communities.

Too many poisonous chemicals are threatening our health.

One in four Americans, including 10 million children under the age of 12, lives within four miles of a toxic waste dump. Corporations continue to manufacture and use about 1,000 new synthetic chemicals every year—adding to the roughly 85,000 already on the market. In 2001, industries reported releasing more than 6.16 billion pounds of toxins into the environment, many of which cause cancer, reproductive and developmental disorders, endocrine disruption, organ and nervous system damage, and more.

We have a right to know.

The Emergency Planning and Community Right-to-Know Act, enacted in 1986, is the best source for public information about toxic pollution. The law requires manufacturing companies to publicly report releases of 667 chemicals and chemical categories, but even so not all industries have to file these reports, and the number of chemicals for which reporting is required represents less than 1% of the full picture. What about the other 99% of the chemicals being used, entering the environment, and putting our health at risk? We have a right to know about these and, indeed, about everything that goes into our air, our water, our soil, our food, our household products, and our bodies.

Industry opposition

Despite their feel-good ads on TV, chemical, food, and consumer products companies have consistently denied our right to know the truth about these things and have fought Right-to-Know laws at every turn and at every governmental level from town halls to the halls of Congress. Since 1989, anti-Right-to-Know industries have contributed over $68 million to political candidates. Nearly 50% of this money came from the chemical industry.

The chemical industry has not restricted its activities to campaign contributions. It's also backed legislation that would scrap existing requirements for up to 90% of the toxic chemicals now reported under the Community Right-to-Know Act. These same polluters have also sought to weaken existing Right-to-Know programs by consistently fighting to cut EPA funding for them from federal budgets. In recent years, the EPA has collected public documents for use in the preparation of congressional bills that would seek to add significant new sources of toxic pollution to existing Right-to-Know laws, including hazardous waster incinerators, the mining industries, and utilities. Polluters have worked overtime to block such expansions. The Chemical Manufacturers' Association even sued the EPA in an attempt to prevent efforts to increase the number of toxic chemicals that are reported to the public.

Industry Claims

"This information serves no useful purpose."
Guy D. Tenini,
DuPont Dow Elastomers

"[T]he addition of materials accounting information to the Toxic Releases Inventory will result in substantial costs to our facility..."
Franklin R. Wheeler,
Texaco Refining & Marketing, Inc.

"Confidential business information can be seriously jeopardized."
Craig R. Doolittle & Susan E. Taylor,
The Dow Chemical Company

"Our experience is that the current TRI data is not well understood and more data would only further confuse the public."
Geoffrey L. Oberhause, Colorite Polymers

Turning the tide

We disagree and believe that the existing Community Right-to-Know laws should not only be protected from these and other attacks but expanded to include:

Full Disclosure Polluters must inform the public about all of the chemicals they use and release into the environment.

No Loopholes Polluting industries like mining, incinerators and utilities should not be exempt from Right-to-Know rules.

Toxics Use Reporting Industries should be required to report all their chemical use and any possible exposure to chemicals in the workplace, in transport through communities, in consumer products and via disposal into our environment.

Warning Labels Food and other products containing potentially toxic and/or genetically modified ingredients should have clear warning labels so consumers can make informed choices about the things to which they expose their families.

What you can do

Nearly 20 years after the passage of the original Right-to-Know Act, the public still only has access to information about less than 1% of the chemicals being used today, and many industries remain exempt from reporting their releases of even this limited number of chemicals. In addition, labels on food, personal care, cleaners, and other consumer products remain incomplete and inadequate.

In an attempt to remedy these problems, Right-to-Know legislation of various types is continually being introduced in both the U.S. Senate and the House of Representatives that addresses our inherent right to know what's being put in our environment, and our food and other products. These bills are invariably sent to committee where industry lobbying succeeds in killing them for the session.

What's needed to counter these influences is some lobbying of our own. To ensure that polluters don't continue to block Right-to-Know expansions:

- Please send letters to your congressional delegation asking them to support or sponsor legislation that would expand current Right-to-Know regulations to encompass all toxic substances regardless of their type or production amounts, and all industries that use or release them. Ask them to require complete and accurate labeling of foods and other products.
- Send a letter to the editor of your local paper encouraging the same.

Sample Letter

Dear (Senator or Representative) ________________________

I am writing to ask you to support broad expansion of the existing toxics release Right-to-Know law and better labeling of consumer products.

Current laws require the reporting of less than 1% of the estimated 85,000 chemicals in use today. We need to protect and expand the public's right to know about any and all hazardous materials that are being released into the environment regardless of their type or the quantities involved. To that end, I ask that you sponsor or support new Right-to-Know legislation that would require:

- Full reporting about all toxic chemicals and materials transported through our neighborhoods; produced, used and stored in the workplace; contained in consumer products; and released into the environment.
- Full reporting by all industries engaged in the production, transportation, handling or use of toxic materials of both the specific materials and substances themselves and the quantities used.
- Industries to inform parents if foods or products contain chemicals that may cause cancer, reproductive, endocrinological, or neurological harm, or contain genetically modified ingredients.

I also ask you support labeling laws for all consumer products, including cleaning and personal care products, that would require companies to clearly list all ingredients they contain. I have a fundamental right to know about all the potentially toxic materials in my community, my workplace, my home, and my body. I hope you will work to protect this right by making expanded Right-to-Know legislation a high priority in the current session of Congress.

Sincerely,
YOUR NAME

Right-to-Know lessons learned from success in New Jersey & Massachusetts

Pollution prevention

In 1986, a forward reaching New Jersey state law was enacted requiring companies to collect and publicly report how toxic chemicals are used within manufacturing facilities. In 1989, Massachusetts enacted its own Toxics Use Reduction Law with expanded Right-to-Know reporting. The results of these state laws are remarkable:

- The Massachusetts Department of Environmental Protection's analysis found that, from 1990 to 1995, toxic chemical use has been reduced by 20% and hazardous waste generation decreased by 30%.
- Over the same five-year period, national data shows that for the country, as a whole, similar categories of hazardous wastes increased by 6%.
- The New Jersey Department of Environmental Protection's December 30, 1996 study, Industrial Pollution Prevention Trends in New Jersey, found that between 1987 and 1994 hazardous wastes decreased as a result of pollution prevention by approximately 50%.

Reduced costs

In addition to the environmental benefits, the economic benefits are also impressive. Two different analyses of the New Jersey program have found that for every $1 spent on this additional reporting and planning, companies are saving between $5 and $8 on pollution reduction activities. Both states have found that the industry sectors that have shown the greatest pollution reductions are also among the most economically healthy.

Industries in Massachusetts saved $14 million between 1990 and 1997, according to the Massachusetts Department of Environmental Protection. By collecting and reporting how chemicals are used within each facility, companies discover efficient ways to do business. They streamline processes and minimize excess chemical use, creating less waste. The cost of waste treatment is then dramatically reduced. The value of human health and the ecological benefits of the Act were not tallied into this figure.

Case Studies

Companies that prevent pollution save money

- Lockheed Martin Defense Systems, of Pittsfield, MA, reduced the use of ozone-depleting solvents from 125 tons per year to less than 2 tons per year. Lockheed Martin saves $497,000 in solvent purchasing costs; $17,500 in waste disposal costs; and $65,000 in record keeping costs annually.
- Fisher Scientific, Inc., of Fair Lawn, NJ, saves an average $529,000 per year by reducing chemical use and waste by 48%.
- Cranston Print Works, of Webster, MA, adjusted its wastewater process to eliminate 2.66 million pounds of sulfuric acid annually. Cranston saves $60,000 due to chemical reductions and $20,000 due to lowered maintenance costs each year.
- Frigidaire, of Edison, NJ, saves approximately $1 million each year by reducing the use of lubrication oil by 50% and by reducing the use of trichloroethylene from 720,000 pounds per year to zero.

Protection of trade secrets

Massachusetts and New Jersey's expanded Right-to-Know laws protect trade secrets. Fewer than 10 companies a year present a trade secret request claim. In every instance, the trade secret claim has been granted.

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phone: 202-546-9707 e-mail:uspirg@pirg.org web site: www.uspirg.org

Part 4: Unacceptable Ingredients

A prelude to the chemicals

The list of chemicals in this section is by no means complete. There are thousands upon thousands of individual chemicals in products that are available for consumer use, most of which have not been adequately tested for their effects on human and environmental health. This list is a brief summary of some of the more frequently encountered consumer chemicals that, in our opinion, should not be used in any product, especially and most critically those marketed as "environmentally responsible." The list contains chemicals whose effects on human and environmental health are sufficiently hazardous to preclude their use under any circumstances.

While you may use this list as a general guide to selecting products and ingredients, individual purchasing decisions should be made on an as-thorough-as-possible analysis of the product's specific ingredients, which may or may not appear on this list.

By the same token, while each entry contains as complete a list as possible of the types of household products that might incorporate the chemical or class of chemicals in question, it is possible that a particular ingredient may be found in product types not mentioned here.

Unless otherwise noted, the term "synthetic" refers to chemicals made from petroleum. Synthetic chemicals are generally undesirable. In addition to any specific local health or environmental impacts the use of a synthetic chemical may cause, they are made from petroleum, a non-renewable resource whose extraction, refining and transportation can cause major environmental degradation. Manufacture of synthetics is also often an energy intensive process that may introduce a variety of toxic chemicals into air and water. Many do not readily biodegrade and thus bioaccumulate in the environment.

As you begin, a word of encouragement is in order. There are over five million known chemicals. Each must have its own name so scientists can differentiate between them. As a result, chemical names tend to be long and difficult to pronounce. Don't be intimidated by names or pronunciations. Unfortunately, most chemicals also have more than one name. Some even have 10 or more! If you choose to do your own research, try using the system of CAS (Chemical Abstract Services) numbers to help eliminate confusion.

If a product's ingredients are not fully and completely disclosed on its label, we strongly recommend avoiding that product.

The Chemicals

Alkanolamines

(also monoethanolamine, diethanolamine,triethanolamine) A family of synthetic surfactants and solvents, this group of compounds is used to neutralize acids in products to make them non-irritating. Alkanolamines are slow to biodegrade. Diethanolamine can react with nitrogen oxides in the atmosphere or with sodium nitrite to form diethanolnitrosamine, a probable carcinogen.

Found in:

Personal care products and some detergents.

Alkyl aryl sodium sulfonates

(see Alkyl benzene sulfonates [ABS])

Alkyl benzene sulfonates or ABS

(also linear alkyl benzene sulfonates or LAS) A class of synthetic surfactants (see Surfactants for more information). ABS are very slow to biodegrade and are seldom used. LAS, which degrade to a greater extent than ABS, are the most common surfactants in use. During the manufacturing process, carcinogens and reproductive toxins such as benzene are released into the environment. While LAS do biodegrade, they do so slowly. LAS are synthetic and are of low to moderate toxicity. The pure compounds may cause skin irritation on prolonged contact, just like soap. Allergic reactions are rare. Because oleo-based alternatives are available, LAS should not be used.

Found in:

Laundry detergents (usually identified as "anionic surfactants") all-purpose cleaners, hard surface cleaners.

Alkyl benzyl sulfonates

(see Alkyl benzene sulfonates [ABS])

Alkyl phenoxy polyethoxy ethanols

(also nonyl phenoxy ethoxylate or nonyl phenol, or APEs) This is a general name for a group of synthetic surfactants (see Surfactants for more information). They are slow to biodegrade in the environment and have been implicated in chronic health problems. Researchers in England have found that in trace amounts they activate estrogen receptors in cells, which in turn alter the activity of certain genes. For example, in experiments they have been found to stimulate the growth of breast cancer cells and feminize male fish. One member of this family of chemicals is used as a common spermicide, indicating the general level of high biological toxicity associated with these compounds.

Found in:

Laundry detergents, all-purpose cleaners, hard surface cleaners.

Ammonia

Ammonia is a natural substance, and essential to all life on Earth. Our bodies routinely incorporate ammonia into our metabolic processes. However, in high concentrations ammonia is an irritant that affects the skin, eyes and respiratory passages. The symptoms of extreme ammonia exposure are: a burning sensation in the eyes, nose and throat; pain in the lungs; headache; nausea; coughing; and increased breathing rate. Ammonia is included as a toxic chemical on the EPA's Community Right-to-Know list and the EPA has set limits on permissible levels in bodies of water. The FDA also regulates the amount of ammonium compounds in food. OSHA regulates the maximum allowable levels in the air to protect workers. Avoid cleaning products that use high concentrations of ammonia.

Found in: window cleaners.

Amyl acetate

A volatile solvent, amyl acetate is found in banana oil and is also produced synthetically. In high concentrations, amyl acetate is a neurotoxin implicated in central nervous system depression. Therefore, you should avoid excessive use of cleaners with volatile substances like amyl acetate. If you do use such cleaners, be sure to work in well-ventilated areas.

Found in:

Furniture polishes, bananas.

Anionic surfactants

(see alkyl benzene sulfonates)

Aromatic hydrocarbons

A class of synthetic compounds used as solvents and grease cutters, these are members of the carcinogenic benzene family of chemicals. Though not all are carcinogenic, aromatic hydrocarbons should nonetheless be considered hazardous. Aromatic hydrocarbons also contaminate air and groundwater. (Once underground they cannot easily evaporate, and little biological activity exists there to cause them to biodegrade.)

Found in:

Heavy-duty degreasers, deodorizers.

Artificial fragrances

Artificial fragrances are made from petroleum. Many do not degrade in the environment, and may have toxic effects on both fish and mammals. Some are suspected hormone disruptors, or suspected carcinogens. Additionally, they often can cause allergies and skin or eye irritation.

Artificial colors

Artificial colors are made from petroleum, though some are made from coal. Many do not degrade in the environment and also have toxic effects on both fish and mammals. Some are suspected carcinogens. They seldom serve any useful purpose. Additionally, they often can cause allergies and skin or eye irritation.

Benzalkonium chloride

A synthetic disinfectant and bacteriacide, this chemical is biologically active (meaning it can negatively affect living organisms). Benzalkonium chloride is a member of the class of disinfectants referred to as "Quats." Quats are slow to degrade in the environment and are highly toxic to aquatic life. The widespread, indiscriminate use of bacteriacides is also now causing the emergence of new strains of bacteria that are resistant to them. Benzalkonium chloride, and other synthetic disinfectants, should be avoided for these reasons.

Found in:
Spray disinfectants, disinfecting cleaners, disinfecting hand soaps and lotions.

Benzene

(also benzol, benzole, annulene, benzene, phenyl hydride, coal naphtha) Made from petroleum and coal, benzene is classified by the International Agency for Research on Cancer as a carcinogen, is listed in the 1990 Clean Air Act as a hazardous air pollutant, and is on the EPA's Community Right-to-Know list.

Found in:
Oven cleaners, degreasers, furniture polish, spot removers. Benzene is seldom an ingredient in consumer products. However, it may be present as an impurity in other chemicals, especially petroleum solvents.

Butoxyethanol

(see butyl cellosolve)

Butyl cellosolve

(also butoxyethanol, butyl oxitol, ethylene glycol, monobutyl ether) A toxic synthetic solvent and grease cutter that can irritate mucous membranes and cause liver and kidney damage. Butyl cellosolve is also a neurotoxin that can depress the nervous system and cause a variety of associated problems.

Found in:
Spray cleaners, all-purpose cleaners, abrasive cleaners.

Butyl oxitol

(see butyl cellosolve)

Caustic soda

(see sodium hydroxide)

Chlorine

(also known as hypochlorite, sodium hypochlorite, sodium dichloroisocyanurate, hydrogen chloride, hydrochloric acid) Chlorine was first manufactured on an industrial scale in the early 1900s. It was used as a powerful poison in World War I. Chlorine is the household chemical most frequently involved in household poisonings in the U.S. Chlorine also ranks first in causing industrial injuries and deaths resulting from large industrial accidents. Chlorine is an acutely toxic chemical created through the energy intensive electrolysis of water. This manufacturing process also creates extremely toxic byproducts. Sodium hypochlorite (known as household bleach, a 5% solution of sodium hypochlorite) is a chemical precursor of chlorine and should be treated as such because any use will create pure chlorine in the environment. Sodium dichloroisocyanurate, typically found in automatic dishwasher products, also releases chlorine during use.

In addition to its direct toxic effects on living organisms, chlorine reacts with organic materials in the environment to create other hazardous and carcinogenic toxins, including trihalomethanes and chloroform (THMs), and organochlorines, an extremely dangerous class of compounds that cause reproductive, endocrine and immune system disorders. The most well known organochlorine is dioxin. Products containing chlorine (or any of its derivatives or precursors, including sodium hypochlorite) should be considered highly unacceptable. Similarly, any chemical with "-chlor-" as part of its name, or any ingredient listed as "bleach" (except non-chlorine, or oxygen, bleach) should be considered unacceptable as this nomenclature indicates the presence of a potentially toxic and environmentally damaging chlorinated compound. Chlorine and chlorinated compounds are also a prime cause of atmospheric ozone loss. Chlorine use in the laundry also degrades both natural and synthetic fibers.

Chlorine is listed in the 1990 Clean Air Act as a hazardous air pollutant and is on the EPA's Community Right-to-Know list. In 1993, the American Public Health Association issued a resolution calling for the gradual phaseout of most organochlorine compounds.

Found in:
Laundry bleach, disinfecting cleaners, scouring powders, automatic dishwasher detergent, and basin, tub and tile cleaners.

Chlorophene

(see o-Benzyl-p-chlorophenol)

Cocamide DEA

(also cocamide diethanolamine, fatty acid diethanolamines, fatty acid diethanolamides) Even though this surfactant, which is a foam stabilizer, is made from coconut oils, it is unacceptable because it contains diethanolamine. This synthetic component can react with sodium nitrate or nitrate oxides to form carcinogenic compounds called nitrosamines.

Found in:
Dishwashing liquids, shampoos, cosmetics.

Cocamide diethanolamine
(see cocamide DEA)

Crystalline silica
Crystalline silica is carcinogenic and acts as an eye, skin and lung irritant.
Found in:
Scouring cleaners.

Diammonium EDTA
(see EDTA)

Diethanolamine
(see Alkanolamines)

1,4-Dioxane
(also diethylene dioxide, diethylene ether, diethylene oxide—not to be confused with *dioxin*). Dioxane is a solvent classified by the EPA as a probable human carcinogen, and some research suggests that it may suppress the immune system. Dioxane is listed in the 1990 Clean Air Act as a hazardous air pollutant and is on the EPA's Community Right-to-Know list.
Found in:
Window cleaners.

Diethylene oxide
(see Dioxane)

EDTA
(ethylenediaminetetraacetate) A class of synthetic compounds used to reduce calcium and magnesium hardness in water. EDTA is also used to prevent bleaching agents from becoming active before they're immersed in water, and as a foam stabilizer. EDTA does not readily biodegrade and once introduced into the general environment can redissolve toxic heavy metals trapped in underwater sediments, allowing them to re-enter and recirculate in the food chain.
Found in:
Laundry detergents, all-purpose cleaners, and cosmetic products.

Ethyl cellosolve
This synthetic solvent is both a nasal irritant and a neurotoxin (see Butyl cellosolve).
Found in:
All-purpose cleaners.

Ethylene glycol
(also ethylene dihydrate, ethylene alcohol) This synthetic solvent is both a nasal irritant and a neurotoxin (see Solvents). Its vapors contribute to the formation of urban ozone pollution. Ethylene glycol is listed in the 1990 Clean Air Act as a hazardous air pollutant and is on the EPA's Community Right-to-Know list.
Found in:
All-purpose cleaners, automotive antifreeze.

Ethylene glycol monobutylether
(see butyl cellosolve)

Fatty acid alkanol amides/amines

These surfactants are made by reacting an ethanolamine with a fatty acid obtained from either synthetic petroleum sources or natural vegetable oils. (Most fatty acids are produced synthetically as this method is currently less expensive.) Excess diethanolamine in fatty acid diethanol amides can react with materials in the environment to form nitrosamines (see Alkanolamines).

Found in:

Shampoos and conditioners, liquid dish detergents, cleansers, and polishes.

Fatty acid diethanolamines

(see cocamide DEA)

Formaldehyde

Although not common as a primary ingredient, formaldehyde is present as a contaminant in many consumer household products. It is a known human carcinogen and respiratory irritant. Formaldehyde may appear as a preservative. Products containing this chemical should be considered unacceptable.

Found in:

Deodorizers, disinfectants, germicides, adhesives, permanent press fabrics, particleboard.

Germicides

A broad category of usually synthetic bacteriacides. While some germicidal ingredients are natural (tea tree oil, borax), it is safe to assume that any germicide ingredient has a synthetic source until proven otherwise. For more information, see benzalkonium chloride above.

Found in:

Spray disinfectants, disinfecting cleaners, disinfecting hand soaps and lotions.

Glycol ethers

(see butyl cellosolve)

Hydrochloric acid

(also see chlorine and muriatic acid) A strong mineral or "inorganic" acid. In high concentrations, it is extremely corrosive.

Found in:

Toilet bowl cleaners.

Hypochlorite

(see chlorine)

Hydrogen chloride

(see hydrochloric acid)

Kerosene

(also mineral spirits) A synthetic distillate used as a grease cutter, kerosene can damage lung tissues and dissolve the fatty tissue that surrounds nerve cells. Mineral spirits and aromatic hydrocarbon solvents function similarly

and often contain the carcinogen benzene as an impurity.
Found in:
Heavy-duty degreasers, furniture polishes, all-purpose cleaners and scouring cleaners (use of kerosene in these last product categories is rare).

Linear alkyl benzene sulfonates or LAS
(see alkyl benzene sulfonates)

Linear alkyl sulfonates
(see alkyl benzene sulfonates)

Methanol
(also methyl alcohol) A solvent derived from wood or petroleum, methanol is acutely toxic and can cause blindness.
Found in:
Glass cleaners.

Methyl alcohol
(see methanol above)

Mineral acids
(see hydrochloric acid)

Mineral spirits
(see kerosene)

Monoethanolamine
(see Alkanolamines)

Morpholine
A toxic synthetic solvent that can cause liver and kidney damage. While this ingredient is rare in consumer products, its extreme toxicity warrants its inclusion on this list.
Found in:
All-purpose cleaners and abrasive cleaners, waxes, polishes, antiseptic products.

Muriatic acid
(see hydrochloric acid)

Naphthas
(see petroleum distillates)

Naphthalene
A member of the carcinogenic benzene family derived from coal tar or made synthetically. Known to bioaccumulate in marine organisms, naphthalene causes allergic skin reactions and cataracts, alters kidney function and is extremely toxic to children.
Found in:
Deodorizers, carpet cleaners, toilet deodorizers.

Nitrilotriacetic acid
(see NTA)

Nonyl-phenol
(see alkyl phenoxy polyethoxy ethanols)

Nonyl phenoxy ethoxylate
(see alkyl phenoxy polyethoxy ethanols)

NTA (Nitrilotriacetic acid)

This carcinogenic phosphate substitute is banned in the U.S. As with EDTA, it can free heavy metals in the environment and reintroduce them into the food chain. NTA is slow to biodegrade.

Found in:

No U.S. manufactured products. However, imported products, especially laundry detergents, should be scrutinized to ensure that no NTA has escaped regulatory attention.

o-Benzyl-p-chlorophenol

(also 4-chloro-a-phenyl o-cresol, chlorophene) A synthetic disinfect used in hand soaps, this is a chlorinated hydrocarbon and is therefore unacceptable. Bacterial resistance hazards associated with the indiscriminate use of disinfectants (see benzalkonium chloride above for more information) can also occur with use.

Found in:

Hand soaps.

Optical brighteners

Optical brighteners are a broad classification of many different synthetic chemicals that, when applied to clothing, convert UV light to visible light, thus making laundered clothes appear "whiter." Their inclusion in any formula does not enhance or affect the product's cleaning performance in any way; they simply trick the eye. Optical brighteners do not readily biodegrade. They are toxic to fish when washed into the general environment and can cause allergic reactions when in contact with skin that is then exposed to sunlight. Most optical brighteners are given trade names which consumers are unlikely to see on a label.

Found in:

Laundry detergents.

Organic solvents

(see also kerosene, petroleum distillates, petroleum hydrocarbons)
A category of solvents and greasecutters of mostly synthetic origin (organic in this instance refers to their petroleum origins). All chemicals in this category are generally neurotoxins and nervous system depressants.

Found in:

All-purpose cleaners, degreasers, furniture polishes, and metal polishes.

p-Dichlorobenzene

(see Paradichlorobenzene)

Paradichlorobenzene

(also p-Dichlorobenzene, PDCB)
A chlorinated synthetic associated with chronic toxicities and of environmental concern. Paradichlorobenzene is an endocrine disrupter and carcinogen. It does not readily biodegrade.

Found in:

Mothballs and deodorizers.

PDCB

(see Paradichlorobenzene)

Perchloroethylene (also "Perc")

A chlorinated solvent used most commonly in the dry cleaning process, "Perc" is implicated in 90% of all groundwater contamination.

Found in:

Degreasers, spot removers, dry cleaning fluids.

Petroleum-based waxes

A broad category of synthetic waxes. Although they may appear in products like butcher's wax, typically these are used for polishing or waxing in conjunction with a solvent and a spray. Once sprayed, the solvent evaporates (creating air pollution) and leaves the wax behind as a residue. Additionally, spraying is an inefficient way to apply a product and ingredients that rely on spraying for dispersal are suspect.

Found in:

Furniture polishes and floor waxes.

Petroleum distillates

(also petroleum naphthas) A broad category encompassing almost every chemical obtained directly from the petroleum refining process. Any ingredient listed as a "petroleum distillate" or "naphtha" should be suspect as it is, firstly a synthetic and, secondly, likely to cause one or more detrimental health or environmental effects.

Found in:

Furniture and floor polishes, degreasers, and all-purpose cleaners.

Phosphates

A key nutrient in ecosystems, phosphates are natural minerals important to the maintenance of all life. Their role in laundry detergents is to remove hard water minerals and thus increase the effectiveness of the detergents themselves. They are also a deflocculating agent; that is, they prevent dirt from settling back onto clothes during washing. While relatively non-irritating and non-toxic in the environment, they nonetheless contribute to significant eutrophication of waterways and create unbalanced ecosystems by fostering dangerously explosive marine plant growth (see Eutrophication under "Water Impact" in the section "What Makes an Ingredient Undesirable?"). For these reasons they are banned or restricted in many states. Products containing phosphates should be considered unacceptable. Almost all automatic dishwasher detergents contain phosphates.

Found in:

Laundry detergents, all-purpose cleaners, automatic dishwasher detergents.

Phosphoric acid

(also mataphosphoric acid, orthophosphoric acid) Phosphoric acid is a "mineral" acid, like hydrochloric acid. In high concentrations, phosphoric acid is highly corrosive. Phosphoric acid is included as a toxic chemical on the EPA's Community Right-to-Know list. It is also controlled under the Clean Air Act as an air pollutant. OSHA regulates the maximum allowable levels in the workplace to protect workers.

***Found in*:**
Bathroom cleaners.

Polyethylene glycol

(also PEG) Another type of anti-redeposition agent, PEG is a polymer made from ethylene oxide and is similar to some non-ionic detergents. Not considered toxic, it takes large doses to be lethal in animals. However, PEG is slow to degrade and is synthetic.

Found in:
Laundry detergents, cosmetic products, food products.

Propylene glycol

A synthetic solvent much like ethylene glycol. Of the two, propylene glycol is less toxic, and it is often touted as a "safe" alternative in automotive antifreeze.

Quaternium 15

An alkyl ammonium chloride used as a surfactant, disinfectant and deodorant that releases formaldehyde. See Benzalkonium chloride.

Found in:
Sanitizing all-purpose cleaners, deodorizers, and disinfectants.

Soda lye

(see sodium hydroxide)

Sodium dichloroisocyanurate

(see chlorine)

Sodium hydroxide

(also lye, caustic soda, white caustic, soda lye). Sodium hydroxide is derived either from soda ash mined in the western U.S. or from the electrolysis of brine (sea water) as a co-product of chlorine. It is a strong, caustic substance and causes severe corrosive damage to eyes, skin and mucous membranes, as well as the mouth, throat, esophagus and stomach. Injury can be immediate. Blindness is reported in animals exposed to as little as a 2% dilution for just one minute. Skin is typically damaged when exposed to 0.12% dilutions for a period of one hour. Tests with healthy volunteers exposed to the chemical in the spray from oven cleaners showed that respiratory tract irritation developed in 2 to 15 minutes. Sodium hydroxide is ubiquitous in the environment. However, it should be avoided in high concentrations (usually indicated by the terms Caution!! Corrosive!! on cleaning products). Sodium hydroxide is included as a toxic chemical on the EPA's Community Right-to-Know list. It is also a controlled substance in the workplace, and OSHA has set limitations on concentrations in the air.

Found in:
Oven cleaners, drain cleaners.

Sodium hypochlorite (see chlorine)

Stoddard solvent

A petroleum distillate used as a solvent and degreaser. (see kerosene)

Surfactants

Found in:
Laundry products, all-purpose cleaners, dish detergent and dish liquids, and most other common cleaning products.

Tetrapotassium polyphosphate or TSP

Basic phosphates (tetrasodium being the more common of the two) used to reduce water hardness. See phosphates.

Found in:
Laundry detergents, all-purpose cleaners, dishwasher detergents.

Trichloroethane

(also methyltrichloromethane, TCA, methyl chloroform, chloroethane). A chlorinated solvent used for cleaning and degreasing, it is known to contribute to depletion of stratospheric ozone and was scheduled to be phased out by 2002. Trichloroethane is listed in the 1990 Clean Air Act as a hazardous air pollutant and is on the EPA's Community Right-to-Know list.

Triethanolamine

(see Alkanolamines)

Xylene sulfonate

A surfactant made from xylene, a petrochemical, and sulfuric acid. Slow to biodegrade in the environment.

Found in:
Laundry products, all-purpose cleaners, dish detergent.

Part 5: Further Suggested Reading

The Non-Toxic Times,
our own free Seventh Generation e-newsletter, covers a wide variety of issues relating to toxins in the home and environment. Delivered via e-mail, each monthly edition offers readers a wealth of current toxins news and views, strategies for healthier living, information on specific toxins and safer alternatives, book and web site reviews, and other related features. To sign up for a free subscription, go to **www.seventhgeneration.com**.

Toxic Deception: How the Chemical Industry Manipulates Science, Bends the Law, and Endangers Your Health,
by Dan Fagin, Marianne Lavelle and the Center for Science in the Public Interest. Birch Lane Press, 1996.
This is an exceptional book that explains in great detail why we can't depend on the EPA to protect us from dangerous chemicals.

Our Stolen Future,
by Theo Colburn, Dianne Dumanoski and John Peterson Myers. Plume/Penguin, 1997.
If you only read one book on this list—read this one. It explains how chlorine, dioxin and the whole class of hazardous and carcinogenic toxins cause reproductive, developmental, endocrine and immune system disorders.

Living Downstream: An Ecologist Looks at Cancer and the Environment, by Sandra Steingraber. Addison Wesley, 1997.
This book is both exhaustively researched and beautifully written. Sandra compellingly documents her case that 80% of all cancer is environmentally related and carefully looks at the chemicals that may be to blame. Highly recommended!

Toxics A - Z: A Guide to Everyday Pollution Hazards,
by John Harte, Cheryl Holdren, Richard Schneider and Christine Shirley. University of California Press, 1991.

Staying Well in a Toxic World,
by Lynn Lawson. The Noble Press, 1993.

A Consumer's Dictionary of Household, Yard and Office Chemicals, by Ruth Winter. Crown Publishing, 1992.

The Non-Toxic Home and Office: Protecting Yourself and Your Family From Everyday Toxics and Health Hazards,
by Debra Lynn Dadd. Jeremy Tarcher, 1992.

Rachel's Environment and Health Weekly,
an outstanding newsletter published weekly by the Environmental Research Foundation, 105 Eastern Ave., Suite 101, Annapolis, MD 21403. (410) 263-1584.

The Sierra Club Green Guide,
by Andrew J. Feldman. Sierra Club Books.
This guide is the most comprehensive we've found to resources and organizations dealing with environmental health and toxics issues.

Safe Shopper's Bible: A Consumer's Guide to Non-Toxic Household Products, Cosmetics, and Food,
by David Steinman and Samuel S. Epstein, M.D.
Macmillan, 1995.
This book has the most complete evaluation of brand name household products we have ever seen. Highly recommended!

Home Safe Home: Protecting Yourself and Your Family from Everyday Toxics and Harmful Household Products,
by Debra Lynn Dadd. Jeremy P. Tarcher/Putnam, 1997.
For a more detailed discussion of how to make your home less toxic, this book is great!

Living Healthy in a Toxic World,
by David Steinman and R. Michael Wisner. Perigee, 1996.

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4. ***Chemical Exposure & Human Health: A Reference to 314 Chemicals,*** Cynthia Wilson. McFarland & Co., 1993.

5. ***The VNR Dictionary of Environmental Health and Safety,*** Frank S. Lisella, Van Nostrand Reinhold, 1994.

6. ***The Merck Index,*** Merck Co., 12th Edition.

7. ***Living Downstream: An Ecologist Looks at Cancer and the Environment,*** Sandra Steingraber. Addison Wesley, 1997.

8. ***Toxic Deception: How the Chemical Industry Manipulates Science, Bends the Law, and Endangers Your Health,***
Dan Fagin, Marianne Lavelle and the Center for Science in the Public Interest. Birch Lane Press, 1996.

9. ***Our Stolen Future,*** Theo Colburn, Dianne Dumanoski and John Peterson Myers. Plume/Penguin, 1997.

10. ***Safe Shopper's Bible,*** David Steinman and Samuel S. Epstein, M.D. Macmillan, 1995.

seventh GENERATION®

212 Battery Street, Suite A, Burlington, VT 05401
802-658-3773 (phone) 802-658-1771 (fax)
www.seventhgeneration.com