OVERVIEW:
In this activity, students look at several common household products, many of which can be harmful to living things. They determine the level of danger that each product presents, and consider safer alternatives for their homes.

ESTIMATED TIME:
2 classes (plus homework)

KEY S.O.L. OBJECTIVES:
Science
- Life Science (6.1.12)
- Resources (6.1.11)
- Scientific Reasoning (6.1.1, 6.2)
Math
- Probability & Statistics (7.19)
- Computation & Estimation (6.7, 8.4)
Language Arts
- Reading/Literature (6.5, 7.6, 8.4)
- Writing (6.7)

MATERIALS: (for each group)
Part I:
- Label It! graphic organizer (student pages)
- How Toxics Reach Our Waterways diagram (teacher pages)
- Guide to Household Hazardous Products and Their Alternatives booklet (student pages)
- Various containers from household products (cleaners, soaps, polishes, aerosols)
Part II:
- Calculators
- De-Tox Your Home: Hazardous Products Survey (student pages)
- De-Tox Your Community: Hazardous Products Tally Sheet (teacher's pages)

VOCABULARY:
fertilizer, hazardous waste, irritant, pesticide, toxic
BACKGROUND:
Most of us don't realize that a lot of the products we use in and around our homes can be very dangerous to our health, and the health of nearby waters. Some products contain irritants that can pollute the air that we breathe inside our homes. Others may cause skin rashes, headaches, itchy or sore eyes, and a host of other problems. What's more, everything that is flushed down the toilet, poured into a drain, or washed into the gutter eventually makes its way into local waterways, and then into the Chesapeake Bay. In areas where toxics in the water have become particularly concentrated, fish have been found with tumors and lesions. Some seafood is so contaminated that eating it means risking one's health.

This activity allows students to investigate the various toxicity levels of products that they see and use in their own homes. They will read and interpret product labels, make decisions about which products are safest, and consider potential courses of action for reducing household hazardous waste.

TEACHER PROCEDURE:
PART I
Preparation prior to the activity:
1. Copy the How Toxics Reach our Waterways diagram for each group (or make an overhead transparency).
2. Empty and clean several household product containers or boxes. Be sure to securely tape any openings to tops, spouts, or lids so that students cannot open them and are not exposed to the remnants of the products. If you cannot obtain empty containers, remove the product labels (be sure to adequately mark the contents of the product to avoid confusion) and attach to index cards. If possible, obtain product containers from your school's maintenance crew, or ask fellow teachers to donate products from their homes.

3. Use the diagram How Toxics Reach Our Waterways to facilitate a discussion about household hazardous waste with your students.

4. Divide your class into cooperative groups of 3-5 students and provide each group with 4-6 different household products to examine.

5. Students are to read the product labels on the containers and complete the Label It! graphic organizer. They will need to use the Guide to Household Hazardous Products and Their Alternatives booklet in the student pages to help them complete the graphic organizer. In addition, a Hazardous Products chart is included in the student pages to help them with unfamiliar terms.

After each group has completed its graphic organizers, allow it to present one of its products to the rest of the class. It should tell the class what the product is, what it is used for, how toxic it is (if at all), and whether there is a safer option available.

3. Some products will have consumer information phone numbers on the label. If you have access to a telephone in your classroom or nearby, encourage students to call companies for information missing from the label, or with any other questions that they may have about the product. In addition, students can request a free Materials Safety Data Sheet which details information about the product, including its composition, physical data, health hazard data, and environmental impact. Some companies may be reluctant to give out this information, but it is available to consumers and companies are required by law to provide it upon request!
6. Discuss the importance of disposing of hazardous solid wastes at the appropriate facilities in Section V. See W.A.V.E.S. Action Projects for more information about starting a household toxic waste reduction campaign.

PART II
Preparation prior to the activity:
1. Contact your county department of planning and zoning to find out the number of households in your county.
2. Copy the De-Tox Your Community: Hazardous Products Tally Sheet for each student OR create a transparency and complete it as a class.

1. Review the De-Tox Your Home: Hazardous Products Survey (student pages) with your class. The survey asks students to determine the “toxicity” of their homes by checking off the number of toxic products found in their homes.

2. Assign the survey for homework. The following class meeting, have students work with their groups to complete questions 3-6 in their student pages.

3. For step 4 of the tally sheet, pass out calculators and provide students with the number of households in the county as furnished by your local department of planning and zoning. Students will use the information gathered from their survey to complete the De-Tox Your Community: Hazardous Products Tally Sheet.

4. Question 7 in the student pages asks students to come up with one (1) thing they can do to save the Chesapeake Bay and their local tributary from the harmful effects of household hazardous waste and then write a detailed paragraph. Have students complete these questions individually.

JOURNAL ENTRIES:
- Design a product label for a nontoxic alternative to one of your products. Include the contents of the product, as well any additional information consumers should know.

- The Chesapeake Bay Foundation is attempting to convince people living in the watershed to reduce their use of hazardous household products by 50%. Would this be possible for your family? Talk with other members of your household to determine whether or not you can do without some of your regular products, or replace them with safe alternatives. Write out your plan for household hazardous waste reduction. See Section V: From Words to Action for the Toxic Use Reduction Campaign action project.

EXTENSIONS:
- Have students create an environmentally friendly cleaning product. Allow them to use art supplies (cardboard, markers, paint, etc.) to actually create the packaging for their product, including the label. Then they should come up with a slogan or short commercial to sell their product to consumers.

- Collect store advertisements and have students compare the actual cost of some popular toxic household cleaning products to their nontoxic alternatives, or if possible have students record product prices the next time they are in the store. What do the results of their investigation reveal? Facilitate a discussion about consumer choices and advertising campaigns. Do popular toxic products clean any better than their nontoxic alternatives? What are the long term and short term ramifications of using toxic products?

RESOURCES:
- To receive other factsheets about the Chesapeake Bay and household toxics, contact the Chesapeake Bay Foundation in Richmond at 804-780-1392.

W.A.V.E.
Think! What’s Under the Sink? 313
Visit the Environmental Defense’s website at www.scorecard.org to locate polluters in your community. Simply supply your ZIP code and the ED website will provide the names and rankings of the area’s largest polluters!

**ASSESSMENT IDEA:**
Assign each group member a grade based on their *Label It!* graphic organizer, or grade each student’s response to questions 7 and 8 in Part II.
How Toxics Reach our Waterways

**AIR POLLUTION**
Fossil fuel combustion (car and truck exhaust), solid waste incinerators, and industry release toxic substances into the air, which then fall to the water or onto the land where they can wash into a nearby waterbody or soak into groundwater.

**STORMWATER RUNOFF**
Rain picks up pollutants in the air, then everything in its path as it runs over rooftops, streets, sidewalks, and any impervious surface. Runoff contains oil, antifreeze, byproducts of vehicle wear, fertilizers, pesticides, asphalt, paints, and more.

**INDUSTRIAL OUTFALL PIPES**
There are no discharge regulations for 99 percent of the chemicals in use by industry.

**HERBICIDES & PESTICIDES**
Applications from lawns, nurseries, gardens, and farms can soak into groundwater or run off with rain water.

**HOUSEHOLD PRODUCTS**
The average American home contains 15-20 pounds of hazardous materials such as cleaners, car products, garden supplies, paints, and solvents. Many of these are flushed down drains or left in landfills where they can soak into groundwater.
DIRECTIONS:
To estimate your community's household hazardous waste fill in the blanks below using the data collected in your Hazardous Products Tally Survey. Your teacher will provide you with the figure you need for Step 4.

Step 1
Take each individual total from the survey and add them together to get a grand total of hazardous products for your group.

GRAND TOTAL: ________

Step 2
Number of survey participants: ________

Step 3
To determine average number of hazardous materials per household:

\[
\text{grand total} \div \text{(# participants)} = \text{average for household}
\]

Step 4
Number of households in your community*:

*Available through your local department of planning.

Step 5
Estimated number of household hazards in your community:

\[
(\text{average for household}) \times (\text{# households}) = (\text{estimated number for community})
\]
THINK! WHAT'S UNDER THE SINK?

INTRODUCTION:
Many products that we use regularly in the home, like cleaners, fertilizers, and pesticides, can be dangerous to our health and to the health of the environment. When toxic products are used in our homes, they can pollute the air that we breathe. Exposure to these products can cause skin rashes, itchy or burning eyes and noses, headaches, and breathing problems. Sometimes the effects of toxic substances are not so obvious or immediate, and we may not even know that we are getting sick. What's more, when these products go down the drain or toilet, they may not be removed by treatment at a wastewater treatment plant, which means these chemicals can end up in the Chesapeake Bay, or in our drinking water!

You might be surprised at how many of these toxic products you have in your own home. The average American household uses about 18 pounds of hazardous waste each year. That means that inside the watershed, we generate 103,739,940 pounds of household toxic waste per year! Many of these products can be replaced by non-toxic alternatives.

In this activity, you will look at some common household products, figure out whether or not they are dangerous, and learn about safe alternatives.

MATERIALS:
Part I:
• household products (or product labels)
• Label It! graphic organizer (student pages)
• Guide to Household Hazardous Products and Their Alternatives booklet

Part II:
• calculator
• De-Tox Your Home: Hazardous Products Survey
• De-Tox Your Community: Hazardous Products Tally Sheet

VOCABULARY:
fertilizer, hazardous waste, irritant, pesticide, toxic
PROCEDURE:
Part 1:
Work with your group to investigate the household products provided by your teacher.

1. Which of the products do you recognize? Have you seen any of them at home or in your school? List any products you recognize in the space below.

   •
   •
   •
   •

2. Have each group member choose one (1) product to study and complete their own Label It! graphic organizer for that product.

3. Use the product label and the Guide to Household Hazardous Products and Their Alternatives booklet to help you complete the Label It! graphic organizer.

4. Some of the words in the booklet may be new to you. Below is a list of hazardous products terms and their definitions.

<table>
<thead>
<tr>
<th>Hazardous Products Terms</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FLAMMABLE:</strong> can be easily set on fire</td>
</tr>
<tr>
<td><strong>TOXIC:</strong> a hazardous substance that causes negative effects to living things or environment</td>
</tr>
<tr>
<td><strong>CORROSIVE:</strong> chemical action can burn or destroy living tissues or other material brought into contact</td>
</tr>
<tr>
<td><strong>EXPLOSIVE:</strong> can explode when exposed to heat, sudden shock, pressure, or certain chemical substances</td>
</tr>
</tbody>
</table>

For pesticides:

- **DANGER:** highly toxic
- **WARNING:** moderately toxic
- **CAUTION:** slightly toxic

For household products:

- **POISON:** highly toxic
- **WARNING or CAUTION:** slightly toxic
- **DANGER:** extremely flammable, corrosive or highly toxic
5. If there is any information missing from your product label, look to see if there is a consumer information telephone number on the label. If there is, ask permission from your teacher to call and get the missing information.

6. When everyone is finished, give each member of your group a chance to briefly present what they have learned about their product using the information from the *Label It!* graphic organizer.

7. As a group, select one (1) product to present to the class. This is your opportunity to teach the class about the product. Tell what the product is used for, how toxic it is (or isn’t), and what safe alternatives (if any) might be used instead.
Part II:
1. Review the De-Tox Your Home: Hazardous Product Survey with your class.

2. Complete the survey for homework. If possible, do the survey with your parents.

3. After completing the survey, meet with your group again.

4. Collect the results for each category from every member of the group. How many hazardous products did your group find in your homes? In the space below, calculate the average number of household products found.

_ AVERAGE # of HAZARDOUS PRODUCTS: ___________ ___________ ___________

5. With your group, complete the De-Tox Your Community: Hazardous Products Tally Sheet. (Your teacher will tell you how many households there are in your community.)

6. Can any of the toxic products found in your homes be replaced by a nontoxic alternative?
   a. Write the names of three (3) products that can be replaced with nontoxic alternatives. Write the names of the alternative next to each product.

   • ____________________________
   • ____________________________
   • ____________________________

   b. Now write the names up to three (3) toxic products you found in your homes (if any) that can not be replaced with nontoxic alternatives.

   • ____________________________
   • ____________________________
   • ____________________________

7. On your own, brainstorm to come up with one (1) thing you can do to help save the Chesapeake Bay and your local tributary from the harmful effects of household hazardous waste.

8. Use a separate sheet of paper to write a paragraph describing your idea. Be sure to use information from this activity to support your ideas.
“De-Tox” Your Home
Hazardous Products Survey

Thank you for completing this survey. Although it is not a scientific survey, we hope it will be a useful tool to help you learn how to reduce toxics in the Bay.

Directions

Go through each room in your home and look for the products listed below. Place a (✓) check next to the product if you find it in your home. Do NOT check the box if you find an environmentally friendly alternative. Use the TOXIC SCALE to let you know how toxic your household might be.

KITCHEN
- oven cleaner
- floor cleaner
- wax
- drain opener
- all-purpose cleaner
- ammonia
- auto dishwashing detergent
- floor wax
- other_____

BATHROOM
- disinfectant cleaner
- toilet bowl cleaner
- mildew cleaner
- tub/tile cleaner
- scouring powder
- other_____

LAUNDRY
- bleach
- detergent
- stain remover
- other_____

HOUSEHOLD CLEANERS

LIVING ROOM
- window/glass cleaner
- rug cleaner
- furniture polish
- air freshener
- other_____

AUTOMOTIVE
- oil
- antifreeze
- car batteries
- gas/kerosene
- other fuel
- other_____

LAWN & GARDEN
- pesticides
- weedkiller
- fertilizer
- fungicide
- rodenticide
- pool chemicals
- other_____

MISCELLANEOUS CLEANER
- silver/metal polish
- batteries (all kinds)
- indoor bug spray
- flea/tick supplies
- mothballs
- other_____

MISCELLANEOUS
- latex paint
- glue
- paint thinner
- oil-based paint
- stripper
- wood preservative
- varnish
- other solvents
- photochemical
- other_____

✓ TOTAL ___

TOXIC SCALE
20 or less = Doing well
20-35 = Try a little harder
35 or more = HELP!
Guide to Household Hazardous Products and Their Alternatives

AUTOMOTIVE PRODUCTS

REPRESENTATIVE TOXIC INGREDIENTS:
Oil, petroleum distillates, sulfuric acid (batteries), heavy metals such as lead (batteries), propylene glycol (antifreeze), ethylene glycol (antifreeze)

PROBABLE HEALTH EFFECTS:
Inhaling fumes can have harmful long-term effects. These products are very poisonous if accidentally ingested and could cause respiratory and cardiac failure, kidney and brain damage. Battery acids can splash and cause skin burns. Antifreeze is very toxic. It takes only three ounces to be fatal to an adult. Because of its color and sweet odor, each year, thousands of animals die from antifreeze poisoning.

POSSIBLE ENVIRONMENTAL EFFECTS:
One quart of oil can pollute a million gallons of water. Most of these chemicals are deadly to fish and wildlife in very small quantities.

ALTERNATIVES:
Drive less, carpool, use public transportation, bike or walk when possible. Use absorbent material such as kitty litter or absorbent pads to soak up automotive spills such as oil, then collect and properly dispose of the material. Since nontoxic alternatives do not yet exist for many automotive products, it is most important to properly and safely dispose of them and recycle oil, antifreeze, and car batteries.

HOUSEHOLD BATTERIES

REPRESENTATIVE TOXIC INGREDIENTS:
Metals such as zinc, lead, mercury, nickel, cadmium, silver, electrolytes, sulfuric acid and accumulated gases, alkalines.

PROBABLE HEALTH EFFECTS:
If chemical substances leak or explode they can cause internal and external burns and irritation.

POSSIBLE ENVIRONMENTAL EFFECTS:
Harmful chemicals and metals contained in batteries can accumulate and concentrate in water-life, wildlife, and humans.

ALTERNATIVE:
Bring spent batteries to designated collection sites for recycling, separate from regular waste. Use solar-powered batteries, windup watches, rechargeable batteries or AC adapters.

HOUSEHOLD CLEANERS

REPRESENTATIVE TOXIC INGREDIENTS:
Chlorinated phosphates, detergents, ammonia, organochlorides, dry bleach, sodium bromide, EDTA or naphtha, chlorine

PROBABLE HEALTH EFFECTS:
Ingredients are irritating to the skin, eyes, respiratory tract. They can be corrosive and depress
the central nervous system. Long-term effects include liver and kidney poisoning. Also, toxins can concentrate in human fatty tissue and can be found in the blood stream and breast milk, where they are then transmitted to babies. Deadly chlorine gas results from the mixing of ammonia with bleach and can cause coughing, loss of voice, and a feeling of burning and suffocation. Ammonia vapors can cause eye, lung, and skin irritation. Detergents are responsible for many household poisonings, and liquid detergents can burn skin. Automatic dishwashing detergent is more toxic and harmful than hand-washing detergent. Children should be kept away from automatic dishwashing detergent, because dry detergents can become airborne and inhaled as dust. Short-term exposure causes coughing, irritation and burning of skin, eyes and respiratory tract.

POSSIBLE ENVIRONMENTAL EFFECTS:
Most ingredients cause air and water pollution. Products containing phosphates cause algal blooms, which steal oxygen from waterways. Chlorinated materials can react to form other compounds, which are very stable in the ecosystem and are stored in the tissue of wildlife, causing reproductive failures. EDTA binds with heavy metals in our waterways, exposing wildlife to danger. Metals can cause tumors and reproductive failures. Automatic dishwashing detergent may contain arsenic, which is toxic to wildlife. If used as a disinfectant, bleach is classified as a pesticide and can join with other compounds to become more toxic.

ALTERNATIVES:
Safe and cost-effective alternatives to toxic cleaners are plain soap, borax, vinegar, and baking soda. Baking soda and warm water is a good all-purpose cleaner, easy to use and safe. It will clean and deodorize kitchen and bathroom surfaces. Vinegar and water in a pump bottle is a good substitute for ammonia glass cleaner. Baking soda can be used as a scouring powder and cleaner along with other minerals such as salt or pumice. Tub and tile cleaners can be made with variable amounts of pumice, zeolite, borax, and baking soda depending on the job. Wipe bathtubs with vinegar on a sponge, then sprinkle baking soda and rub with a damp sponge and rinse. Remember that you can usually use less of a product and still get good results. Keep pump bottles on hand and use them to control the amount of the product you use. Keep mops, bucket, reusable rags, sponges, and scouring pads in easy reach to quickly clean up messes. Whenever possible try replacing chemicals with water and a little “elbow grease.”

AEROSOLS

INGREDIENTS:
Contain an active ingredient and a liquid or gas propellant that is packed with at least forty pounds of pressure per square inch. These products are explosive and flammable.

PROBABLE HEALTH EFFECTS:
Aerosol cleaners create problems because humans can easily ingest the mist through the nose and mouth, causing dizziness, headache, nausea, eye and throat irritation, skin rash, or liver damage. If exposed to heat, aerosols can explode with great force, causing injury to anyone nearby.

POSSIBLE ENVIRONMENTAL EFFECTS:
Aerosols containing chlorofluorocarbons (CFCs) contribute to ozone depletion. Neither CFCs nor PCBs break down in the environment.

ALTERNATIVES:
Choose products that are either in liquid form or in a pump bottle.
POSSIBLE ENVIRONMENTAL EFFECTS:
These products contain lye and other caustic substances, which can change water pH. These changes harm plants and cause fish kills. Trichloroethane contributes to the depletion of the ozone layer and is a priority pollutant.

ALTERNATIVES:
Prevent drain clogging by using a strainer across drain holes. To loosen clogged drain, pour baking soda followed by vinegar then boiling water. A weekly dose of boiling water poured down the drain will help prevent clogs. Use a plunger or drain snake on major clogs.

FURNITURE POLISHES

REPRESENTATIVE TOXIC INGREDIENTS:
Naphtha, petroleum distillates, propellants, diglycol lavare, nitrobenzene, and amyl acetate.

PROBABLE HEALTH EFFECTS:
May affect the central nervous system, causing headaches and dizziness, confusion and lack of concentration. Some may poison the liver and kidneys, and cause upper respiratory tract problems. Petroleum distillates are associated with skin and lung cancer. Naphthas are particularly toxic to children.

POSSIBLE ENVIRONMENTAL EFFECTS:
These chemicals poison the air and water, and build up in the environment, increasing the cumulative level of toxics. Naphthas can accumulate in sediments.

ALTERNATIVES:
Vinegar and lemon oil, lanolin, and beeswax are all natural furniture polishers. One part lemon juice to two parts olive or vegetable oil is a good all-purpose polish.

HERBICIDES

REPRESENTATIVE TOXIC INGREDIENTS:
Arsenic, glyphosate (e.g., Roundup), chlorinated phenoxyes

PROBABLE HEALTH EFFECTS:
Poisonous and especially hazardous when used around food plants. Chemicals from herbicides may lead to unsafe drinking water, surface water and groundwater. Arsenic inhalation or accidental ingestion can cause nausea, diarrhea, chronic headaches, liver damage and cancer.

ENVIRONMENTAL EFFECTS:
Can be persistent in the environment. Runoff pours harmful chemicals into streams and can upset entire ecosystems, killing aquatic life.

ALTERNATIVES:
Pull weeds by hand, select resistant, native plants for the environment, use weed mat barriers under stones, bricks and decks and around plants.

LAUNDRY PRODUCTS

REPRESENTATIVE TOXIC INGREDIENTS:
Petroleum-based surfactants such as benzene, perchloroethylene, trichloroethylene, naphtha, sodium nitrates, diethanolamine, complex phosphates, sodium hypochlorite (bleach), sodium perborate, p-hydroxybenzoic acid, and oxalic acid.
PROBABLE HEALTH EFFECTS:
Some detergents are caustic and are related to liver poisoning. Others are central nervous system depressants and can cause headaches, lack of concentration, confusion and symptoms of mental illness. Long-term exposure to bleaches can increase risk of bladder, colon and rectal cancer. Some compounds are highly toxic, corrosive, and irritating. Ingestion can cause nausea and vomiting. Fluoridate is so toxic that farmers use it as a pesticide. When exposed to sunlight, detergents can create allergic reactions. Some stain removers are so carcinogenic that health experts recommend they should not be used. Most ingredients are neurotoxins, central nervous system depressants, respiratory irritants, poisonous to the liver and kidney, and lethal if ingested. Toxics can also concentrate in human fatty tissue, causing tumors and reproductive failures.

POSSIBLE ENVIRONMENTAL EFFECTS:
Some create heavy algal blooms depriving water of oxygen, while others break down slowly in the environment and poison fish. Chlorine compounds are toxic to plants, causing burns and internal damage. Complex phosphates cause algal blooms. EDTA binds with heavy metals. Metals can cause problems such as tumors and reproductive failure. Chlorinated compounds can be stored in wildlife fatty tissue, causing problems such as tumors and reproductive failure. Optical brighteners do not biodegrade well. Powdered detergents usually contain more heavy metals than liquid detergents, the most striking case being arsenic, which is very toxic to wildlife. Trichloroethylene is directly toxic to freshwater and saltwater organisms. Benzene is a priority pollutant.

ALTERNATIVES:
Use washing soda and borax in place of detergent. Use borax to whiten in place of bleach. Powdered soap flakes, washing soda, or borax can substitute as detergents, and baking soda can remove stains and disinfect. For stains, always treat the problem immediately for best results. For blood stains, soak with cold water or club soda. For perspiration stains, dab with a sponge soaked in a weak solution of vinegar or lemon juice. For ink stains, use cream of tartar and lemon juice. For chocolate stains, soak with club soda.

METAL POLISHES

REPRESENTATIVE TOXIC INGREDIENTS:
Triopolyphosphate, oxalic acid, sulfuric acid, phosphoric acid, naphtha, silver nitrate and chromic acid.

PROBABLE HEALTH EFFECTS:
Metal polishes contain toxics that cause lack of concentration and symptoms of mental illness. These toxics can concentrate in human fatty tissue, in the blood stream and breast milk. They increase cancer risk and cause reproductive failure.

POSSIBLE ENVIRONMENTAL EFFECTS:
Most ingredients are hazardous and slow to break down in the environment. Naphtha accumulates in sediments and magnifies in toxicity as it moves up the food chain. Phenol is a priority pollutant.

ALTERNATIVES:
Olive oil retards tarnishing of brass. Baby oil is a great polish for chrome. Polish silver by soaking in boiling water with baking soda, salt and aluminum foil. For copper, use a paste of lemon juice and cream of tartar and leave on for five minutes, then wash in warm water and rub with a dry, soft cloth.
MOBTHBALLS

REPRESENTATIVE TOXIC INGREDIENTS:
Naphthalene, paradichlorobenzene

PROBABLE HEALTH EFFECTS:
Mothballs may look like candy to a child. They are poisonous when ingested, and seizures can develop within one hour. Inhalation can produce harmful effects. Exposure over a long period of time can result in headaches, nose, throat and lung irritation, and liver and kidney damage. Absorption of naphthalene may occur through the skin. Children are particularly susceptible.

ALTERNATIVES:
Substitute cedar blocks or chips and natural herbs for mothballs. Vacuum often and clean closets, baseboards and in cracks in floors. Store laundered or dry-cleaned clothes in cedar closets or boxes, or have them professionally stored to prevent moth infestation.

PAINTS

REPRESENTATIVE TOXIC INGREDIENTS:
Toluene, xylene, methylene chloride, lithopone, pentachlorophenol, kerosene, acetone, petroleum distillates, lead, mercury, and titanium dioxide.

PROBABLE HEALTH EFFECTS:
Solvents can cause eye, skin and lung irritation, headaches, nausea, dizziness and fatigue. Short-term and long-term exposure includes muscle weakness and liver and kidney damage. High levels of lead in paint can cause brain damage in small children and high blood pressure in adults. Paint solvents are especially of concern to people with heart conditions and those who wear contact lenses. Methanol and certain other solvents can stress the heart. Contact lenses may absorb strong vapors and hold them against the eye, causing irritation or damage.

POSSIBLE ENVIRONMENTAL EFFECTS:
Toluene adds to urban smog. Improper paint disposal leads to air, land and water pollution. Some exterior latex paints contain a mercury pesticide to provide mildew resistance. Mercury is very toxic to wildlife and humans. Lead, mercury, toluene, methylene chloride and pentachlorophenol are priority pollutants.

ALTERNATIVES:
Buy and use only what you need. Latex paints are safer than oil-based paints because they are free of flammable and toxic solvents. Avoid powdered art supplies such as paints and pastels that create hazardous dust. Use liquid paints instead. Avoid instant papier-mache. Try alternatives such as vegetable-based or milk-based paints. When remodeling or refinishing, wear protective clothing and respirators and work in well ventilated areas.

PAINT THINNER AND OTHER SOLVENTS

REPRESENTATIVE TOXIC INGREDIENTS:
Toluene, xylene, acetone, naphthalene, and methanol. Methylene chloride, benzene, phenol, and carbon tetrachloride.

PROBABLE HEALTH EFFECTS:
Ingredients in thinners or turpentine are extremely toxic and can be harmful through inhalation, skin and eye contact, and ingestion. Symptoms may include eye, nose and throat irritation, dizziness, unconsciousness, and dermatitis. Ingestion can cause central nervous system
depression, lung, kidney and tissue damage. Some of these toxic gases cause cancer, birth defects or genetic damage. Short-term exposure causes irritation to eyes and throat. Long-term exposure affects the heart, liver and kidneys. Precautions should include wearing protective clothing, gloves, goggles, and a mask, as well as working in a well ventilated area.

POSSIBLE ENVIRONMENTAL EFFECTS:
Toluene and xylene contribute to urban smog. Many of these poisons break down slowly in the environment and can cause long-term exposure to aquatic life. Toluene and naphthalene are priority pollutants that accumulate in sediments and increase the toxicity available to wildlife. These poisons are slow to break down in the environment affecting the land, air and water. Methylene chloride stays in the groundwater for years and travels great distances in the aquifer, spreading contamination. Methylene chloride, benzene, phenols and toluene are priority pollutants.

ALTERNATIVES:
Use water with water-based paints. Use water-based markers and white glue or paste instead of solvent-based adhesives. Use naturally weather-resistant woods like cedar or redwood for surfaces and railings, protect with a water-repellent paint or linseed oil. Use sandpaper to hand or heat strip. For staining, use natural earth pigments. Renew hard paintbrushes by soaking in hot vinegar for a few minutes, then wash and dry. Paint thinner can be reused many times by storing a small amount in a glass jar and regularly filtering out the sediments.

PESTICIDES

REPRESENTATIVE TOXIC INGREDIENTS:
There are over 1400 different active pesticide ingredients used in over 45,000 pesticide formulations. Hazardous ingredients include anilazine, metals such as zinc and copper compounds, benzene, carbaryl (Sevin), malathion, chlordane, diazinon, and hexachloride. Also included are arsenicals, fungicides, pyrethroids, chlorinated hydrocarbons, and organophosphates.

PROBABLE HEALTH EFFECTS:
All chemical sprays and many of the organically approved botanicals are toxic to people. Pesticide poisoning may be acute or chronic. Many pesticides are also carcinogenic. Potential hazards include poisoning by interfering with the central nervous system, irritating the skin, eyes, or throat, causing reproductive failures, kidney and liver damage, and cancer. Store all pesticides in a safe place away from children and pets to prevent accidental poisoning.

POSSIBLE ENVIRONMENTAL EFFECTS:
Most of these toxic gases are very slow to biodegrade in the environment and can accumulate in the food chain and in the fatty tissue of wildlife. Accidental spills have caused fish kills in waterways.

ALTERNATIVES:
Spray house plants with nonchemical compounds like a mixture of soap and water. Indoors use the least toxic products, such as boric acid. Outdoors use beneficial insects (such as spiders, lacewings, and ladybugs) and plants that repel pests (such as marigolds and tansy). Use nontoxic traps and keep indoor areas clean and free of crumbs. Fix leaks; seal cracks or holes around windows, doors, and pipes where pests may gain entrance. Use floating row covers on garden crops. For ant problems, wash counters, floors, and cabinets with vinegar and water. For mosquitoes, eliminate stagnant water and encourage natural predators such as dragonflies, praying mantis, and bats. For flea and tick problems, try herbal collars, and feed pets brewer's yeast. Flea-comb and bathe pets regularly.
OVEN CLEANERS

REPRESENTATIVE TOXIC INGREDIENTS:
Methylene chloride, petroleum distillates, glycol ethers, lye and butyl cellusolve.

PROBABLE HEALTH EFFECTS:
Some cleaners can burn the skin and cause respiratory distress. Nearly all cleaners are neurotoxins, which affect the central nervous system, causing headaches, confusion and lack of concentration. Most are corrosive and poison the liver and kidneys. Methylene chloride is a probable carcinogen.

POSSIBLE ENVIRONMENTAL EFFECTS:
EPA considers many of these toxics hazardous waste. Slow to break down in the environment, these toxics may concentrate in the fatty tissue of wildlife and cause problems such as tumors and reproductive failure. Methylene chloride degrades the groundwater and is a priority pollutant.

ALTERNATIVES:
Use baking soda paste left on the oven surface overnight then scrub with a sponge or abrasive pad.

TOILET BOWL CLEANERS

REPRESENTATIVE TOXIC INGREDIENTS:
Sodium hydroxide, hydrochloric acid, chlorinated phenols, sodium acid sulfate, complex phosphates, fungicides, and o- or p-dichlorobenzene.

PROBABLE HEALTH EFFECTS:
These chemicals are highly toxic and corrosive. Short-term exposure can burn skin and eyes, and inhalation harms respiratory tract. Long-term exposure causes liver and kidney damage and depresses the central nervous system, causing headaches, confusion, lack of concentration and symptoms of mental illness.

POSSIBLE ENVIRONMENTAL EFFECTS:
EPA classifies many of these toxics as hazardous waste. These chemicals form with other compounds that are slow to break down in the environment and build up in the fatty tissue of wildlife and humans, causing such problems as tumors and reproductive failure. Some products that contain blue dye have high amounts of chromium. Chromium, chlorinated phenols and dichlorobenzene are priority pollutants.

ALTERNATIVES:
Borax works well if left in the toilet to soak an hour or more before cleaning. Pumice stone is also a good stain remover. For rings, mix borax and lemon juice into a paste, let sit for two hours and scrub thoroughly. Make sure you use a good scrub brush.

References
The Household Hazardous Waste Wheel prepared by the Environmental Hazards Management Institute, Durham, NC, 1988.