Hazardous Substances in My Home?

Students learn how to identify hazardous household products by reading product labels.

Level(s): 6-8

Subject(s): Life Science, Chemistry, Physical Science

Virginia SOLs: 6.7 a, f; 6.9c; LS12 d, e; PS2 f

Objectives:
1. Students will be able to list the four characteristics that identify a material as hazardous.

2. Students will be able to name potentially hazardous products that can be found in the home.

Materials: **For the teacher:**
- Overheads: "Hazardous Household Substances", "Hazardous Substance Characteristics", and "Hazardous Substance Toxicity Chart"
- Examples of hazardous household products such as polishes, cleaners, pesticides, etc). Be sure that the containers are empty, with the lids taped shut.

For each student:
- Handout: "Inventory of Potentially Hazardous Household Products"
- Handout: "Common Safer Substitutes for Hazardous Household Products"

Estimated Time: **two 45-50 minute class periods**

Background Information:

Hazardous Household Products, p.138 , Hazardous Waste, p.140.

Preparation: see "Materials" above

Activity Procedure:

Day One
1. List the Discussion/Test Questions on the board. Have students brainstorm answers to these questions.

Discussion/Test Questions

A. Name two potentially hazardous products that can be found in each of the following areas in your home:
   1. bathroom (toilet bowl cleanser, certain household cleansers, drain cleaner)
   2. kitchen (oven cleaner, window cleaner, furniture polish)
   3. garage/ basement (pesticides, flea powders, paint, paint thinner, motor oil)

B. Name four characteristics that identify a material as hazardous. Can a product have more than one hazard?

2. Show the overhead "Hazardous Household Substances". Discuss: What qualities make something hazardous? (harmful to human or animal health; harmful to the environment) What is waste? (something not needed anymore, or an unwanted byproduct from the manufacture or use of an item)

3. Show the overheads "Hazardous Substance Characteristics" and "Hazardous Substance Toxicity Chart". Ask: What makes some substance more dangerous than others? (the amount required to cause harm). Have students give examples of household products that have hazardous characteristics.

4. Divide the class into five groups. Give each group the *Inventory of Potentially Hazardous Household Products* and the *Inventory of Potentially Hazardous Household Products.* Have the groups look over the inventory and discuss which products they think they might have at home and where they might be kept.

5. Tell students they will use the Inventory to find out what hazardous products they might have in their homes and how these products are labeled to warn the consumer. This can be given as an overnight or longer assignment. Stress that these products are potentially hazardous and that caution should be taken while doing this inventory. Tell the students to ask their parents for assistance.

IMPORTANT: Discuss and make sure students understand the provisions of the warnings on the first page of Inventory. Using some example products that you brought to class, show how to fill out the inventory

6. Have the groups to use the their inventories to prepare a report for class presentation. Divide the products among the groups. Each report should cover:
   - the hazardous characteristics
   - the type of product (automotive, household)
   - the proper method of disposal (recycle, use up, etc)
   - a safer substitute

   Have each group give their report.

Day Two

1. Discuss some or all of the following questions after the students have completed and turned in their surveys. A tally sheet can be prepared that combines the results.
    a. Which items are found most frequently?
    b. Where were most of the products found? What are the best places to store potentially hazardous products? Did you find any products stored unsafely?
    c. What was the most common warning on the labels? Did similar products have similar warnings?
    d. Which products had directions for safe disposal? Did any of the products mention the health effects that the product could have?
    e. Were any products found that did not have adequate warnings, or that were unlabeled?

Assessment Opportunities:

1. Give students the "test questions" discussed at the beginning of the activity.

2. Give each student labels from 2 or 3 household products and have them identify any dangers associated with the product. Ask them to suggest how to safely dispose of the product.

Extensions:

Have student groups create posters for a campaign to alert citizens to the dangers of hazardous household substances and the proper ways to dispose of them.

Adapted from **The No Waste Anthology**, pp 256-268.

Name _____ **Date** _____

Inventory of Potentially Hazardous Household Products

This activity is an inventory. You are going to hunt around your house, basement, and garage to find out which of these products you have at home. Ask your parents to assist you in this activity.

Caution: Do not disturb these products. Some of them might be harmful. Wash your hands carefully after you handle any container. (Not all household products are hazardous.)

1. Check off the items you find in the "√" column. Add others that you find that are not on the list.

2. Write down the quantities that you find. Write down how many containers and the size of containers (12 oz, 1 pint, etc)

3. Write down where you find the product (under the sink, in a kitchen cupboard, on a shelf in the garage, etc.) List both the room and the exact location.

4. Read the labels of the products. Write down any warnings (hazards and characteristics) that are on the labels.

Product	√	How Much?	Location	Warning Labels	Hazard Characteristics	Alternative
House						
Oven Cleaner						
Drain Cleaner						
Toilet Cleaner						
Disinfectants						
Rug or Upholstery Cleaners						

Product	√	How Much?	Location	Warning Labels	Hazard Characteristics	Alternative
House (cont.)						
Floor or Furniture Polish						
Bleach (or cleaners with bleach)						
Photographic Chemicals						
Silver Polish						
Pool Chemicals						
Mothballs						
Powder or Abrasive Cleaners						
Ammonia (or cleaners with ammonia)						
Spot Removers						
Paints						
Enamel or Oil Base Paints						
Latex or Water Based Paints						

Product	√	How Much?	Location	Warning Labels	Hazard Characteristics	Alternative
Paints (cont.)						
Rust Paint						
Thinners and Turpentine						
Furniture Strippers						
Stain or Finish						
Auto						
Antifreeze						
Used Oil						
Brake Fluid						
Transmission Fluid						
Batteries						
Gasoline						

Product	√	How Much?	Location	Warning Labels	Hazard Characteristics	Alternative
Pesticides						
Herbicides (weed killers)						
Rat & Mouse Poison						
Roach & Ant Killer						
Flea Collars and Sprays						
House Plant Insecticides						
Fungicides						
Slug Bait						
Other Garden Pesticides						
OTHER						

Hazardous Household Substances

Item	Why Hazardous	Disposal
Auto Battery	Corrosive, Toxic	Recycle
Drain Cleaner	Corrosive, Toxic	Give to someone to use up or flush small amounts down the drain.*
Empty Aerosol Can	Flammable, Toxic	Place in trash for landfill.
House Cleaners with Ammonia	Corrosive, Toxic, Irritant	Give to someone to use up or flush down the drain.
Oil Base Paint	Flammable, Toxic	Give to someone to use up or Hazardous Waste Collection.
Oven Cleaner	Corrosive, Toxic	Give to someone to use up or Hazardous Waste Collection.
Rat Poison	Toxic	Hazardous Waste Collection.
Roach and Ant Killer	Toxic	Hazardous Waste Collection.
Transmission Fluid	Flammable, Toxic	Recycle
Used Motor Oil	Flammable, Toxic	Recycle

* Only if connected to a sewer system: otherwise, give to hazardous waste collection.

Hazardous Substance Characteristics

Toxic A substance that is potentially harmful to human health, can cause cancer or birth defects, and can contaminate, harm or kill fish or wildlife. Examples: lead, mercury, pesticides	
	**Reactive** An unstable substance that reacts strongly (including exploding) if exposed to heat, shock, air or water. Examples: bleach, and ammonia when mixed together, munitions
Corrosive A highly acidic or basic substance that corrodes storage containers or damages human tissue if touched. Examples: battery acid, bathroom cleaners, pool chemicals	
	**Ignitable** A substance that can exploded, catch on fire, or emit toxic fumes or gases into the environment. Examples: fuels, some cleaning fluids, some furniture polishes

From the California Department of Health Services, Toxic Substances Control Program

Hazardous Substance Toxicity Chart

Warning Word	Toxicity*	Examples
CAUTION	**Moderately Toxic** Lethal Dose: An ounce to a pint.	Ammonia, Most Paints Floor Polishes
WARNING	**Very toxic** Lethal Dose: a teaspoon to a tablespoon	Antifreeze, Bleach, Some fertilizers, Many pesticides
DANGER	**Extremely Toxic** Lethal Dose: a taste to a teaspoon	Rat Poison, Mercury batteries, Some pesticides and weed killers, Paint thinner, Drain opener, Some oven cleaners

* Robert E. Gosselin, et al. *Clinical Toxicology of Commercial products*. Baltimore, MD: Williams and Wilkins 1984, p.1-2.

Hazardous Household Products

from **The No Waste Anthology***, What's in Your House?*

Solvents

Solvents are powerful cleansers that dissolve stains and dirt. Many solvents can cause injury if not used properly. Some solvents can enter the body through the skin because they easily dissolve oily materials (such as the skin oils that protect the skin). If they are inhaled they can irritate mucous membranes in the nose throat and lungs, and can cause nausea, headaches, muscular weakness, drowsiness, a loss of coordination. One of the organs that is most severely damaged by solvents is the liver, which is the organ that removes poisonous chemicals from the body. The eyes are also very sensitive to solvents, which can be splashed or rubbed in when scratching an itch. This is especially dangerous if the victim is wearing soft contact lenses which can absorb the chemicals and hold them against the eyes until the lenses are removed. Solvents dry easily, but the vapors can linger in the air and be breathed in unless the room is well-ventilated.

Drain Openers

Products designed to clear drains that are stopped up often contain a substance called sodium hydroxide, also known as lye (see *pH Ratings of Various Liquids*). It is very corrosive to bodily tissue and can cause burns. The degree of the burn depends on the amount of chemical exposure and the person's sensitivity to it. Drain openers are designed to eat away the materials clogging your drain, such as hair. To avoid the release of toxic fumes they should never be mixed with another brand or with bleach.

Furniture Polish

Furniture polish may contain pretty scents and colors that are attractive to children who can be seriously injured by drinking them. Polishes come in different forms and different chemicals are used to apply the polish onto the furniture. Some polishes contain kerosene-like substances. When ingested they enter the lungs and saturate them so that the lungs cannot function. There is no way to rid the body of the poison or to reverse its effect. The health dangers most often occurring with furniture polishes are from inhalation of fumes, especially aerosols. Another danger is getting the polish into a sensitive part of the body such as the eyes. Most polishes are also flammable and can ignite when applied by someone who is smoking.

Air Freshener

Air fresheners work in one of three ways: 1) covering up the odor with another, stronger one, 2) coating the nasal passages with an oily film to weaken the sense of smell or 3) diminishing the sense of smell with a nerve deadening agent. Many air fresheners simply contaminate the air with another foreign substance. In other words, they don't *freshen* the air at all. Some of the chemicals found in aerosol air fresheners can be extremely dangerous to internal tissues and organs. Aerosols can also become powerful bombs when exposed to heat, external pressure or puncture.

Pesticides

Pesticides are poisons. Some of them remain in the environment for long periods of time and resist natural means of breakdown and decomposition. Some are formulated to rapidly break down. Some pesticides may kill beneficial as well as harmful insects, and can also harm plants,

birds, fish, squirrels and other wildlife. In California it is estimated that each year 14,000 incidents of pesticide exposure result in requests for medical assistance. Most of them are non-occupational exposures involving children in the home or garden.

Pesticides can injure the user if consumed, absorbed through the skin or inhaled. Pesticide poisoning often resembles, and is mistaken for, the flu. Symptoms may include headaches, nausea, dizziness, aches, etc. Some pesticides have also been associated with more damaging effects such as cancer and birth defects.

Hazardous Waste

from **The No Waste Anthology**, p. 154

Disposing of hazardous wastes in a manner that will keep them sealed away forever is a very difficult if not impossible task, The necessity of controlled and careful disposal of hazardous wastes has only been recognized for the last 15 years. For years the disposal of hazardous wastes was not regulated by the government. Many wastes were carelessly disposed of in landfills, ponds or lagoons. Drums of highly toxic substances were disposed of by clandestine operations commonly referred to as midnight dumping. The light of day has revealed dump sites along country roads, in abandoned warehouses, and in fields across the country. The EPA estimates that as of October, 1984, 18,000 potentially hazardous waste disposal sites exist in the United States.

The improper management of hazardous waste can be disastrous to the environment and to public health. Destruction of the environment may take many forms – groundwater and water supply contamination, wildlife habitat destruction, soil contamination, fishkills, livestock loss, air pollution, fire, explosion, and crop damage. Danger to health may be directly related to these environmental effects, but is often more subtle., even undetectable in early stages.

Some of the most troublesome hazardous substances are synthetic organic chemicals. These materials can be highly toxic and some are not easily biodegradable. Many tend to persist in the environment and to accumulate in the fatty tissues of animals. When these animals are eaten by humans or other animals, the chemicals stored in their bodies are transferred. Such substances are eliminated very slowly by normal bodily functions and processes and accumulation proceeds with continued uptake. Whether through ingestion, inhalation, or skin contact, the buildup of these substances can be so dangerous that some chemicals have been banned in the United States.

The first step in dealing with abandoned disposal sites is to identify the types of wastes present and determine potential health risks posed by the hazardous wastes. A hazardous waste is defined by Congress as "discarded material that when improperly managed may pose a substantial threat or potential hazard to human health or the environment". In the form of solids, liquids, sludges or contained gases, these wastes differ from other by-products by fitting into any of the following categories:

Toxic: Wastes containing substances that can cause damage to human health or the environment. Toxic wastes include inorganic toxic metals, salts, and acids or bases, including compounds containing lead, mercury and arsenic. They also include synthetic organic chemicals such as insecticides, DDT, DDE, or endrin; herbicides such as 2,4,5-T and other chlorinated hydrocarbons and PCBs.

Ignitable: Materials prone to spontaneous combustion while being transported or stored. Examples: organic solvents such as benzene, varnish, paint removers, and oil.

Reactive: Wastes having a tendency to explode or generate toxic fumes when exposed to heat, air, water or shock. Examples: obsolete munitions and by-products of explosives and chemical industries.

Corrosive: Substances having the ability to corrode or eat away materials, or ones that can burn or irritate the skin. Examples: battery acid, acid liquids used in etching, alkaline cleaners.

Wastes with any of these characteristics are now subject to regulation under the **Resource Conservation and Recovery Act** (RCRA). Radioactive wastes which also pose serious health risks are managed by the Nuclear Regulatory Commission. The RCRA was created in 1976 (amended in 1984) giving the EPA authority to monitor hazardous wastes from "cradle-to-grave" or from the point of generation to ultimate disposal. The EPA is still in the process of issuing permits to waste storage and disposal sites that meet the new standards. The legislation has been enacted to prevent haphazard disposal of wastes. It does not cover past disposal problems. To deal with the enormous task of cleaning up tons of improperly disposed toxic wastes, a Superfund program was created by Congress in 1980.

Superfund was established by the **Comprehensive Environmental Response Compensation and Liability Act** (CERCLA), which in 1980 provided the EPA with $1.6 billion to clean up abandoned hazardous waste sites. 86% of the fund was financed by taxes on the manufacture and import of certain chemicals and petroleum. EPA lists 786 Superfund sites around the nation. Only 12 of these sites have been fully cleaned; perhaps as many as 2,500 sites could be added to the list at a cost of approximately $23 billion. Cleaning up Superfund sites usually involves trucking the wastes to approved land disposal sites. However, this may provide only a temporary solution the problem since there is much uncertainty about our ability to permanently dispose of hazardous wastes in an environmentally sound manner.

As a result, there is general agreement that to adequately tackle our hazardous waste program we need to reduce the waste stream and implement alternative technologies to neutralize, solidify, recycle and detoxify hazardous materials. Research to perfect these technologies and to bring their costs down is currently underway.

Common Safer Substitutes for Hazardous Household Products

From **The No Waste Anthology**, pp.95-96

Product	Substitute
Ant Control	Pour a line of cream of tartar (a spice found in grocery stores) at the place where they enter the house. The ant will not cross over it. Sprinkle red chili pepper, paprika and/or dried peppermint where ants are entering the house.
Air Freshener	Leave an opened box o f baking soda in the room. Add cloves and cinnamon to boiling water and then simmer. Use fresh flowers and herbs.
Insecticides	Stripping old fruit from the vines and trees will keep insects from laying their eggs in the old fruit, decreasing the number o f baby insects in the garden. Use products like Dipel © for tomato hookworm. Dipel © causes disease only in specific pests and is harmless to humans and pets.
Fertilizer	Compost leaves, grass clippings, and other organic waste. Spread around the base of plants, or mix with soil when planting.
Cleanser (Porcelain Cleaners)	Dip damp cloth in baking soda and rub over stains. You can also make a paste with water and baking soda and apply it to stained surfaces. Allow to set before rubbing clean and rinsing.
Copper Cleaner	Pour vinegar and salt over copper and rub with a damp cloth.
Drain Opener	Prevent clogging by using a drain strainer. Use a plunger or mechanical snake. Pour ½ cup (125 ml) baking soda into the drain followed by 2 cups (500 ml) of boiling water. Flush drain weekly with boiling water for prevention.
Flea & Tick Repellent	Feed pets brewer's yeast, vitamin B and garlic tablets. Herbs such as fennel, rue, and rosemary repel flies. Place eucalyptus seeds and leaves around the area where the animal sleeps.
Furniture Polish	Use small amount of mayonnaise and soft cloth. Mix 3 parts of olive oil and one part vinegar and use soft cloth. Mix one part lemon juice with 2 parts olive oil or vegetable oil and use soft cloth.
General Cleaner	Mix 3 tablespoons ((45 ml) baking soda with one quart (950 ml) warm water.
Insect Repellent	Blend 6 cloves crushed garlic, one onion (minced), one tablespoon (15 ml) dried hot pepper and one teaspoon (5ml) soap in one gallon (4 l) of water. Let set one to 2 days. Strain and spray.
Japanese Beetles	Pheromone taps are available which attract the beetles into a container for disposal in your household trash.
Laundry Detergent	Select a non-phosphate detergent, use baking powder or soap in place of detergent. Make a paste of baking soda and water for dirty spots.
Linoleum Floor Cleaner/Wax	Mop with one cup (250 ml) white vinegar, with 2 gallons (7.6 l) of water to remove dull, greasy film. Polish with club soda. Adding sour milk or skim milk to rinse water will shine the floor without

	polishing.
Mosquito Repellent	Drink brewer's yeast or take in tablet form on a daily basis during summer months. (NOTE: some people are allergic to it, so make sure you are not allergic to brewer's yeast before taking it by swirling it around and spitting it out. If you get any reactions, do not take brewer's yeast.)
Mothballs	Place cedar chips around clothes. Dried lavender can be made into sachets and placed in drawers or closets.
Oven Cleaner	Sprinkle salt on spills when they are warm, and scrub. Mix 3 tablespoons (45 ml) baking soda with one quart (950 ml) warm water. Use non-stick or Teflon © oven liners (reusable trays) to catch spills. Rub gently with steel wool.
Cockroaches	Set out a dish of equal parts baking soda and powdered sugar. Set out a dish of equal parts oatmeal flour and plaster of paris. Rub some grease or petroleum jelly on the inside of a jar that contains a banana. Set a tongue depressor or emery board near the jar to serve as a ramp. The cockroaches will be trapped inside the jar. Place bay leaves around cracks in the room.
Snail & Slug Killer	Fill a shallow pan with stale beer and place in the infested area. Overturn clay pots and the snails will seek shelter in them from the heat. The snails can then be collected. Lay boards between rows of planted vegetables. The snails often attach themselves to the boards and can be collected.
Upholstery Cleaner	Clean stains immediately with club soda. Club soda will also remove spots on rugs.
Window cleaner	Mix ½ cup (125 ml) white vinegar with one gallon (3.8 l) warm water. Use newspapers to dry the glass. Use lemon juice and dry with a soft cloth.
Wood Floor Wax/Cleaner	Mix equal parts cooking oil and vinegar. Apply a thin coat and rub in well. Painted wooden floors can be washed with one teaspoon (5 ml) baking soda and one gallon (3.8 ml) hot water. Rinse with clean water.

Oil & Water Don't Mix

Students perform experiments that demonstrate why oil is such a powerful pollutant of water.

Level(s): 6-8

Subject(s): Life Science; Earth Science; Chemistry

Virginia Sols: 6.5 a,b,f,g; 6.7 a,f; 6.9 a,b,c; LS4 a,b,c; LS12 d,e; PS1 b,d

Objectives:

1. Students will be able to list 3 reasons why oil is a dangerous water pollutant.

2. Students will be able to explain how to correctly recycle used motor oil.

Materials:
For each student group

- a small quantity (e.g. film canister) of either used motor oil, lycopodium powder, or sifted flour
- red tempera poster paint
- 1 glass or clear plastic bowl or other container
- 1 eye dropper
- 1 funnel
- very fine aquarium or parakeet gravel or sand (natural color)
- 1 quart or 1 gallon jar
- 1 measuring cup
- water

Estimated Time: 45-50 minutes

Background Information: *Oil in the Environment*, pp.147.

Preparation:
Assemble the materials needed for the activity, and read the background information.

Procedure:
1. Write the *Questions for the Class* on the board and have students discuss the questions in groups.

2. Go over the questions and the groups' answers, and fill in any missing information from the background information.

3, Have students perform the **Surface Water Experiment**.

Fill the bowl with water. Place several drops of used oil or lycopodium power on the surface. Have students observe and describe how the oil spreads across the surface in a thin film.

4. Discuss the following questions with the students:
   a. What happened to the oil when it was added to the water?
   b. What would happen to marine or freshwater organisms like plankton and insect larvae in this water? (Oil interferes with the life cycle of organisms which use the surface layer as a nursery ground).
   c. Can you get the oil our of the water?
   d. Could the oil and water be separated now?
   e. Would you drink this water?
   f. What would happen to fish living in the water (They would be suffocated by the oil coating their gills)
   g. What would happen to water birds living in the water? (They would drown when the oil coated their feathers and they were no longer able to float on the water).
   h. What would happen to organisms that ate food contaminated with the oil? (They would die from the toxic effects of the oil, or would develop skin or liver cancer.)

5. Have students perform the **Groundwater Experiment**.
   Tell students that many people living in Virginia depend on groundwater for their drinking water. See if they can think of any examples (Charlottesville/Rivanna Reservoir; Town of Orange/Rappahannock River; Roanoke/Spring Hollow Reservoir/Roanoke River).

6. Put a screen at the bottom of the funnel and pour in ½ cup of fine aquarium gravel or sand. Place the funnel in the mouth of the jar. Measure ½ cup of water and pour it into the gravel. Measure how much flows into the jar. Discuss with students what happened to the water that didn't make it through to the jar (held in spaces between the particles of gravel or sand. This is how groundwater is stored in aquifers).

7. Tell students they will simulate the effects of an oil spill on the groundwater. Drop 2 or 3 drops of red water-based paint (oil-based paint will bond to the epoxy coating on some aquarium gravels) or food coloring onto the water –soaked gravel in the funnel. Sprinkle ½ cup of water through it to simulate rainfall. Have students note how much "oil" flushes through and how much remains in the gravel. Pour additional cupfuls of water over the gravel. Note how much water is needed to rinse the gravel clean.

8. Discuss the results with students. Ask how oil or other pollutant could be removed from the groundwater once it got in? Ask how used oil can be kept out of surface and groundwater? (Used oil should be collected in a clean, sturdy metal or plastic container and taken to a participating recycling center or service station. Never mix it with other liquids, because this prevents recycling)

Assessment Opportunities:

Use the *Questions for the Class* to quiz students on what they have learned.

Extensions:

Try pouring water mixed with small amounts of other substances such as soil, organic debris (small pieces of the leaf litter from a forest floor) or talcum powder, and observe the results. How do they differ from the simulated oil?

Questions for the Class

1. When you change the motor oil in your car or your lawnmower, what should you do with it? What should you *not* do with it?

2. How much crude oil does it take to make 2 ½ quarts of lubricating oil?

3. How much used oil can be re-refined to make 2 ½ quarts of lubricating oil?

4. How large an oil slick can one pint of oil produce?

5. What is groundwater? What is the difference between surface water and groundwater?

6. Used automotive oil contributes what percentage of oil pollution in our nation's waterways?

7. What effects does oil pollution have on aquatic life?

Adapted from **Action for a Cleaner Tomorrow**, pp.451-453.

Oil in the Environment

from **The No Waste Anthology**, p.50

Oil can have very serious effects on the environment because it contains hydrocarbons and heavy metals. Students need to learn that oil can be recycled, and that steps should be taken to ensure that oil is not accidentally mixed with water or in contact with plants, animals or soil.

Although the effects of environmental pollution often are difficult to see, a major oil spill gives dramatic evidence of the impact on wildlife. Feathers are damaged, embryos are killed, when oil seeps into eggs, fish suffocate because their gills become clogged, and marine and land animals die from ingesting food and water contaminated with oil.

People attempt to prevent oil spills and "clean up" after oil spills take place. Their actins are not always successful and sometimes without knowing it their assistance does more harm than good. For instance, the process of using detergents to clean oil from the feathers of birds caught in an oil spill can damage the birds' feather structure and arrangement (the birds' waterproofing). Birds may also be more susceptible to disease in this time of stress and may be weakened so that it is difficult for them to secure food and water. Obviously, the quality of food and water sources also may be affected.

Many of us are impressed by the damage done when a supertanker causes an oil spill. Few of us, however, realize the environmental impact of our own waste managing practices.

1. Used automotive oil is the single largest source of oil pollution (over 40%) in our nation's waterways. Most is dumped by people who change their own oil.
   - In 1960 service stations performed 90% of automotive oil changes. Today, do-it-yourselfers change about 60% of the automotive oil.
   - The oil is usually dumped on the ground, in trash going to a landfill, or down a storm drain that leads to streams, lakes or the ocean.

2. During engine use, oil picks up toxic contaminants, carcinogens and heavy metals (lead, zinc, arsenic, chromium and cadmium). If used oil is not properly recycled, these toxics are carried into the environment.

3. One pint of oil can produce a slick on approximately one acre of surface water
   - Fish, waterfowl, and aquatic life are threatened by used oil in waterways. Floating plankton and algae (a basic food source) are killed by oil.
   - Very small amounts of oil rinsed over shellfish beds can ruin the taste of clams and oysters. Less than 300 parts per million can spoil the taste of fish.

4. Used oil thrown out in the garbage seeps through the landfill to contribute to the contamination of groundwater. One quart of oil will foul the taste of 250,000 gallons of groundwater.

5. Used oil can be re-refined into good-as-new lubricating oil. Oil never wears out, it just gets dirty. It takes 42 gallons of crude oil to produce 2 ½ quarts of lubricating oil. But just one gallon of used oil can be re-refined into the same high quality 2 ½ quarts of lubricating oil.

6. Used oil can be reprocessed into fuel oil, which contains about 140,000 BTUs of energy and can be burned efficiently.

7. To recycle used automotive oil, take it in a clean sealed container such as a milk jug to the nearest participating recycling center or service station accepting uncontaminated used oil.
    - Used oil should never be contaminated with antifreeze, gasoline, paint thinner, solvents, cooking oil or other contaminants since these interfere with reprocessing and may make the used oil a hazardous waste.