What Makes a Product Hazardous?

It is estimated that the average house contains 3 to 10 gallons of hazardous products. Many of the products we use for housework, gardening, home improvement, or car maintenance contain potentially hazardous substances. When used or disposed of improperly, these products can become personal health and safety concerns and can also cause problems in the environment. Therefore, it is important to understand what makes a product hazardous, how to identify hazardous substances, and how to use and handle these products safely.

Hazardous Substances

A hazardous substance is defined in federal government regulations as “one that may cause substantial personal injury or illness during reasonable handling or use, including possible ingestion by children.” According to the Federal Hazardous Substances Act (FHSA), household products are hazardous if they contain substances that have one or more of the following hazardous properties:

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Hazardous Properties</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Corrosive Symbol]</td>
<td>Corrosive - capable of eating away materials and destroying living tissue when contact occurs.</td>
<td>Drain cleaners, oven cleaners, and lye.</td>
</tr>
<tr>
<td>![Irritant Symbol]</td>
<td>Irritant - causes injury to the area of the body that it comes in contact with after immediate, prolonged, or repeated contact.</td>
<td>Toilet cleaners, chlorine bleach cleaners, pool chemicals.</td>
</tr>
<tr>
<td>![Strong Sensitizer Symbol]</td>
<td>Strong Sensitizer - causes an allergic reaction upon repeated uses of the same substance, after repeated exposures.</td>
<td>Dyes, oils, resins, rubber, soaps, cosmetics, perfume, insecticides, plants, paints, glues, polishes.</td>
</tr>
<tr>
<td>![Flammable Symbol]</td>
<td>Flammable - A liquid, solid, or the contents of an aerosol can that is capable of burning or causing a fire.</td>
<td>Paint thinners, solvents, adhesives, rubber cement, hair spray.</td>
</tr>
<tr>
<td>![Toxic Symbol]</td>
<td>Toxic - poisonous, either immediately (acutely toxic) or over a long period of time (chronically toxic) e.g., cancer, birth defects, or neurotoxicity (toxic to nerves).</td>
<td>Brake fluids, insecticides, fertilizers, rat poison, antifreeze.</td>
</tr>
</tbody>
</table>

Routes of Exposure

A product is hazardous if it can produce personal injury or illness to humans through a route of exposure: when inhaled, swallowed (ingested), or absorbed through the skin.

1. **Ingestion** – eating or drinking hazardous substances or contaminated foods and water and absorbing these substances through your gastrointestinal tract.
2. **Inhalation** – breathing in gases, vapors, and sprays that are absorbed through the lungs and enter the bloodstream.
3. **Dermal (skin or eye contact)** – hazardous substances contact the skin (dermal) or enter the eye causing injuries.

**HOW DO YOU KNOW IF A PRODUCT IS HAZARDOUS?**

The FHSA requires all products that contain a hazardous substance to be properly labeled. The product must bear a label of specific size and contain certain information, depending on the toxicity of the product. **Signal words** are found on every hazardous product label and describe how toxic or hazardous a product can be. Note: If there is no signal word on a product it is probably not hazardous.

<table>
<thead>
<tr>
<th>Hazard Rating</th>
<th>Signal Words</th>
<th>Hazardous Properties</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>most</td>
<td>POISON</td>
<td>highly toxic</td>
<td>paint/varnish removers, antifreeze</td>
</tr>
<tr>
<td></td>
<td>DANGER</td>
<td>flammable, corrosive, or highly toxic</td>
<td>bleach, spray adhesives</td>
</tr>
<tr>
<td>least</td>
<td>WARNING</td>
<td>“flammable; moderately toxic”</td>
<td>toilet bowl cleaner</td>
</tr>
<tr>
<td></td>
<td>CAUTION</td>
<td>slightly toxic</td>
<td>dishwasher soap, cleanser</td>
</tr>
</tbody>
</table>

**Pesticides – The Other Hazardous Household Product**

Another hazardous substances commonly used in a home or garden are **pesticides**. Pesticides are defined as “chemicals used to prevent, destroy, or repel pests: insect, mice, weeds, fungi, and bacteria”. These chemicals are designed to control pesticides. By using the suffix “-icide” meaning “to kill”, pesticides are easily identified according to the target pest. For example, guess what an “insecticide” kills or a rodenticide or fungicide? Pesticides also include household products, such as disinfectants or cleaners that are used to destroy the growth of harmful bacteria, viruses, or fungi on household surfaces.

Pesticides are regulated by the Environmental Protection Agency (EPA) under the **Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)**. Before any pesticide is available for use, the specific product must meet a few basic standards: (1) the product will not cause harmful effects to human health or the environment; and (2) product labeling must meet FIFRA requirements.

To do their job, pesticides contain toxic substances that control pests. Therefore, pesticide signal words are based on the degree of toxicity or how poisonous the product is. Tests are conducted to determine the **Lethal Dose50 (LD50)** of each pesticide. Lethal Dose50 is when 50% of the test population, which is usually mice or rats, dies when administered a specific dose of a pesticide. The oral LD50 of a substance is expressed in milligrams (mg) of chemical per kilogram (kg) of body weight (mg/kg). Table 2 shows how signal words are based on toxicity for use on pesticide labels.
Table 2. FIFRA Signal Words and Toxicity Rating Scale

<table>
<thead>
<tr>
<th>Hazard Rating</th>
<th>Signal Words</th>
<th>Toxicity</th>
<th>Oral LD$_{50}$ (mg/kg)</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>most</td>
<td>DANGER/POISON</td>
<td>highly toxic</td>
<td>0 - 50</td>
<td>indoor/outdoor insect killer</td>
</tr>
<tr>
<td>least</td>
<td>DANGER</td>
<td>highly toxic/corrosive</td>
<td>0 - 50</td>
<td>toilet bowl cleaner</td>
</tr>
<tr>
<td></td>
<td>WARNING</td>
<td>moderately toxic</td>
<td>50 - 500</td>
<td>flea spray</td>
</tr>
<tr>
<td></td>
<td>CAUTION</td>
<td>slightly toxic</td>
<td>500 - 5,000</td>
<td>rat poison</td>
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</tbody>
</table>

Read Before You Use!
Besides signal words, product labels contain other important information, such as instructions for safe handling, use, and storage; active ingredients; and first aid safety. As a consumer, make it a habit to read all label information before using any product.
STUDENT WORKSHEET 1:  Name_________________________________________Period _______

Part 1: Reading Hazardous Household Product Labels
There is a lot of information on product labels. This activity focuses on identifying hazardous household products based on signal words, hazardous properties, and routes of exposure.

Procedure:
1. Read product labels for the various household products on display. Identify each product’s hazardous properties, signal word, and route of exposures.
3. Answer questions on back.

SAFETY: Be sure that ALL products are handled safely. DO NOT open any products.

<table>
<thead>
<tr>
<th>Product</th>
<th>Hazardous Properties</th>
<th>Signal Word</th>
<th>Route of Exposure(s)</th>
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<tbody>
<tr>
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</table>
STUDENT WORKSHEET 1:  Name_______________________________Period _____

Part 1: Reading Hazardous Household Product Labels - Conclusion Questions:

1. Based on the findings from your product inventory, which hazardous properties were most common?

2. Which signal word was most common?

3. Which products were most toxic? How did you determine this?

4. What are the three routes of exposure? Based on the findings from your product inventory, which route was most common?

5. Which product(s) have signal words based on toxicity testing?

6. What did you learn from this activity?
PESTICIDE LABELS FOR MOLD CONTROL:

LYSOL® DISINFECTANT – Antibacterial Kitchen Cleaner

FRONT LABEL

KEEP OUT OF REACH OF CHILDREN
CAUTION: See back panel for additional precautionary statements.

Active ingredients: Acet (87% Cl, 2% C9, 7% C4, 1% C2, 1% C6, 1% C7)
Dehydropropionic acid (2%) and ammonium chloride (0.5%)
Labels (2%) and ammonium hydroxide (0.5%)
Lysol (2%) and ammonium hydroxide (0.5%)

22 FL OZ. (1 PT 6 OZ.) GT

BACK LABEL

STOVE TOPS
COUNTER TOPS
KITCHEN SINKS

DIRECTIONS FOR USE: It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

To Operate: Turn nozzle counter-clockwise to spray. Adjust to desired pattern.

General Kitchen Cleaning: Spray soiled area, then wipe clean. No rinsing! On painted surfaces, test a small area.

To Disinfect/Sanitize/Deodorize: For hard, nonporous surfaces, spray until thoroughly wet.
To Sanitize/Deodorize: Let stand for 30 seconds before wiping.
To Disinfect/Deodorize: Let stand for 10 minutes before wiping.

For heavily soiled surfaces, first clean according to General Kitchen Cleaning directions. To disinfect nonporous cutting boards, spray until thoroughly wet, let stand for 10 minutes, then rinse thoroughly.

*Kills 99.9% of Staphylococcus aureus (staphylococcus), Staphylococcus pyogenes (staphylococcus),
Streptococcus pneumoniae (streptococcus).

PRECAUTIONARY STATEMENTS: Hazards to Humans and Domestic Animals.
CAUTION: May cause eye irritation. Avoid contact with eyes.
FIRST AID: If sprayed or splashed in eyes, immediately remove contact lenses and rinse eyes with plenty of—

Important Facts About LYSOL Antibacterial Kitchen Cleaner:
Contains no phosphate.
Contains no biodegradable agents. This bottle is made of 25% post-consumer recycled plastic.
Encourage your local authorities to establish a program to recycle this bottle.

EPA REG NO. 7773-9 - EPA ESTATE NO. 7773-9 - 7773-9A-1
QUESTION? COMMENT? CALL 1-800-226-4722
Household Products Division
Reckitt & Colman Inc. Wayne, NJ 07474-0445
© 1996, 1998 RAC
309342

HYDROVILLE CURRICULUM PROJECT ©2004, Oregon State University
http://www.ehsc.orst.edu/outreach.htm
PESTICIDE LABELS FOR MOLD CONTROL:

HEINZ® - Vinegar

Heinz Distilled White Vinegar is made from sun-ripened grain and crystal clear water. With its clean, crisp flavor, it's ideal for your favorite marinades, salads and recipes. And Heinz Distilled White Vinegar is guaranteed to have the full 5% activity required for successful canning and pickling.

INGREDIENTS:
Made from select sun-ripened grain diluted with water to a uniform pickling and table strength of 5% (50 grains) acidity.
**PESTICIDE LABELS FOR MOLD CONTROL:**

**TILEX® – Mildew Remover**

**BACK LABEL**

**AVOID PROLONGED BREATHING OF VAPOR**

**DIRECTIONS FOR USE:** It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

1. **TO REMOVE MIDLEW STAINS:** Turn sprayer nozzle to OPEN position.
2. Spray, wait until stains disappear and rinse.
3. Heavy mildew buildup may need two cleanings. This product may not be able to remove mildew embedded in hard water deposits, old grout or silicone caulking. For soap scum problems, use Tilex® Soap Scum Remover.

**TO DISINFECT AND KILL MIDLEW ON HARD NON-POROUS SURFACES:** Spray surface such as tile until thoroughly wet, let stand five minutes and rinse. For heavy soil, precleaning is required. This product kills staph, strep and athlete’s foot fungus.

**PRECAUTIONARY STATEMENTS:** Hazards to humans and domestic animals.

**WARNING:** CAUSES SUBSTANTIAL BUT TEMPORARY EYE INJURIES AND CAN IRRITATE SKIN. For sensitive skin or prolonged use, wear gloves. Do no get in eyes or on clothing. Vapors may irritate. Use only in well-ventilated areas. Avoid prolonged breathing of vapors. Not recommended for use by persons with heart conditions or chronic respiratory problems such as asthma, emphysema or constructive lung disease. Due to irritating nature, may be harmful if swallowed.

**STATEMENT OF PRACTICAL TREATMENT:** IF IN EYES, hold eyelids open and flush with a steady gentle stream of water for 15 minutes. Get medical attention. IF SWALLOWED, drink large amounts of water. Do not induce vomiting. Call a physician or poison control center immediately. IF BREATHING IS AFFECTED, get fresh air immediately. IF ON SKIN, wash thoroughly with water. Remove constrictive clothing and wash before use. Get medical attention if irritation persists.

**PHYSICAL AND CHEMICAL HAZARDS:** This product contains bleach. Do not use or mix this product with other household chemicals such as products containing ammonia, toilet bowl cleaners, rust removers, vinegar or acid. To do so will release hazardous gases.

**STORAGE AND DISPOSAL:** Store this product in a cool, dry area away from direct sunlight and heat to avoid deterioration. Do not reuse any container but place in trash collection or rinse for recycling.

**FRONT LABEL**

**Use in well ventilated areas.** Open windows and turn on fans before use. If the vapors bother you, leave the room while this product is working. **For sensitive skin or prolonged use, wear gloves.** Do not mix with Tile Soap Scum Remover.

**WHERE TO USE:** Works on tile, grout, tubs, fiberglass, shower doors, vinyl curtains, counters, sinks and no-wax floors. Rinse immediately after use on rubber, plastic, and vinyl. Avoid prolonged contact with metal and old porcelain, as this product can react with these materials and leave a “rusty” stain. Do not use on wood or painted surfaces. Avoid contact with aluminum, clothes, fabric, carpet or paper surfaces, as they will discolor.

**Part 2: Hazardous Household Products Inventory**

In this activity, you will identify some of the hazardous products found in your home. You may be surprised at what you find!

**Procedure:**

1. Take an inventory of the hazardous household products found in your home, garage, kitchen, bathroom, and utility room or basement.

2. Read both front and back labels. Fill in the chart using information on the label.

**SAFETY: Use caution when handling all products.**

<table>
<thead>
<tr>
<th>Product</th>
<th>Signal Word</th>
<th>Route of Exposure</th>
<th>Directions for Use</th>
<th>Storage Location in Home</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</table>
STUDENT WORKSHEET 2:  Name_____________________________________ Period _______

Part 2: Hazardous Household Products Inventory - Conclusion Questions

1. Create a data table to record the following data. Out of the 10 products you identified, how many are labeled Danger, Danger-Poison, Warning, and Caution? What percentage of the sampled products is represented by each category?

2. List products that you identified that were stored improperly (according to manufacturer’s label).

3. If a product label reads “Store away from children”, where would be a safe location to store this product in your home?

4. Based on the manufacturer’s direction for use for a specific product, what would a misuse look like? (For example, how could you misuse an oven cleaner?)

5. What can you do to reduce your route of exposure to hazardous products in your home?
STUDENT HANDOUT 2:

Part 3: Writing a Memo: Results of a Recent Hazardous Household Product Inventory

The memo style is used as a method of internal communication. This is an example of a technical document that may help you communicate technical information with parents or adults in your household. A memo is in the block style and paragraphs are usually six to eight sentences long.

Procedure
1. Based on what you learned from your Hazardous Household Products Inventory and the responses in your Learning Log, create a one-page message that recommends action or commends the adult decision-makers in your household.

2. Write your memo in the following memo format.

   **Heading**
   Date: Today’s date
   To: Names of Household Adult Decision-Makers (parents, grandparents)
   From: Your Full Name
   Subject: This Acts as a Title, Between Seven to Nine Words—capitalize all main words
           (For example, A Follow-up to My Recent Survey of our Household Hazardous Products)

   **Introductory Paragraph**
   The introductory paragraph gives a brief background and states the main point. In this case, it would mention the recent survey of ten items and note two to three key observations.

   **First Heading**
   Report the overall observations from your Hazardous Household Products Inventory.

   **Specific information**
   In this paragraph, students introduce the signal words and review their findings. Lead into the commendations and recommendations for actions based on these findings.

   **Second Heading**
   Include your step-by-step recommendations for action. Begin by commending the readers for good choices they made in safety and storage of household hazardous products. Then suggest in one, two, or three steps what needs to be accomplished to make the home a safe place for children.

   **Conclusion**
   This can be a brief closing with positive comments and a brief allusion to action and future care taken together in this area. *Use brief, active language.*
## A Memo Writing Scoring Guide

<table>
<thead>
<tr>
<th>Category</th>
<th>Possible points</th>
<th>Your score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Style</strong></td>
<td>10</td>
<td></td>
<td><em>Format:</em> How well does the student replicate the document design?</td>
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<td><em>Complete:</em> Does it answer all of the reader’s questions?</td>
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<td><em>Compelling:</em> Is it appropriately effective and/or persuasive?</td>
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<td><em>Tone:</em> Is it at an appropriate level of language for the reader? Are technical terms defined? Can the reader understand it?</td>
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<td><strong>Composition</strong></td>
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<td><em>Clarity:</em> Does it flow naturally and avoid wordiness?</td>
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<td></td>
<td>20</td>
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<td><em>Organization:</em> Is it arranged in a logical form?</td>
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<tr>
<td><strong>Mechanics</strong></td>
<td>20</td>
<td></td>
<td><em>Punctuation:</em> Commas? Periods?</td>
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<td></td>
<td>20</td>
<td></td>
<td><em>Spelling:</em> No spelling or typographical errors.</td>
</tr>
<tr>
<td><strong>Total Score</strong></td>
<td>100</td>
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</tbody>
</table>

**Comments:**