

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**:

Symbol	Hazardous Properties	Examples
	Corrosive - capable of eating away materials and destroying living tissue when contact occurs.	Drain cleaners, oven cleaners, and lye.
	Irritant - causes injury to the area of the body that it comes in contact with after immediate, prolonged, or repeated contact.	Toilet cleaners, chlorine bleach cleaners, pool chemicals.
	Strong Sensitizer - causes an allergic reaction upon repeated uses of the same substance, after repeated exposures.	Dyes, oils, resins, rubber, soaps, cosmetics, perfume, insecticides, plants, paints, glues, polishes.
	Flammable - A liquid, solid, or the contents of an aerosol can that is capable of burning or causing a fire.	Paint thinners, solvents, adhesives, rubber cement, hair spray.
	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).	Brake fluids, insecticides, fertilizers, rat poison, antifreeze.

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 1. FHSA Signal Words for Household Products

Signal Words	Hazardous Properties	Examples
 POISON	highly toxic	paint/varnish removers, antifreeze
DANGER	flammable, corrosive, or highly toxic	bleach, spray adhesives
WARNING	"flammable; moderately toxic"	toilet bowl cleaner
CAUTION	slightly toxic	dishwasher soap, cleanser

Hazard Rating
 most
 ↓
 least

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

Signal Words	Toxicity	Oral LD ₅₀ (mg/kg)	Examples
 DANGER/ POISON	highly toxic	0 - 50	indoor/outdoor insect killer
DANGER	highly toxic/corrosive	0 - 50	toilet bowl cleaner
WARNING	moderately toxic	50 - 500	flea spray
CAUTION	slightly toxic	500 - 5,000	rat poison

Hazard
Rating
most
↓
least

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.
2. Refer to Student Handout 1: *What Makes a Product Hazardous?* to help you fill in the table below.
3. Answer questions on back.

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

Product	Hazardous Properties	Signal Word	Route of Exposure(s)

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



369341

KEEP OUT OF REACH OF CHILDREN

CAUTION: See back panel for additional precautionary statements.

Active ingredients: Alkyl (67% C₁₂, 25% C₁₄, 7% C₁₆, 1% C₈-C₁₀-C₁₈).....0.08%
 Dimethyl benzyl ammonium chlorides.....0.02%
 Alkyl (50% C₁₄, 40% C₁₂, 10% C₁₆) Dimethyl benzyl ammonium chlorides.....0.02%
 Inert ingredients (includes detergents and other grease cutting agents).....99.90%

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



- Kills 99.9% of germs in seconds on hard nonporous surfaces*.
- Kills Bacteria such as Salmonella (Salmonella choleraesuis), E. coli (Escherichia coli), Campylobacter Jesume and Listeria (Listeria monocytogenes).
- Cuts grease & grime.
- Streak-free shine.



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. Not recommended for use on acrylic plastics.
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 Salmonella choleraesuis (salmonella), Escherichia coli (E. coli), Staphylococcus aureus (staphylococcus), Streptococcus pyogenes (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 water for at least 15 minutes.
STORAGE/DISPOSAL: Store in areas inaccessible to small children. Refill container only with LYSOL® Antibacterial Kitchen Cleaner. If not refilling, rinse empty container thoroughly and discard in trash or recycle.

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

E.P.A. REG. NO. 777-66 E.P.A. EST. NO. 777-NJ-2, 8791-MO-1
 QUESTIONS? COMMENTS? CALL 1-800-228-4722
 Household Products Division (See Bottom or Side)
 Reckitt & Colman Inc., Wayne, NJ 07474-0945
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BACK LABEL

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 MILDREW 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 MILDEW 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 not 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 obstructive 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.

CONTAINS NO PHOSPHORUS. BEST IF USED BY DATE BELOW OR ON NECK OF BOTTLE. EPA REG. NO. 5813-24, EPA EST. NO. 5813-CA3, GA1 (ACTUAL EPA SET. NO. IN CODE BELOW OR NECK OF BOTTLE). **QUESTIONS OR COMMENTS:** Call toll free 1-800-227-1860 or visit us at www.tilex.com. Mfd. For & © 2002 The Clorox Company, Oakland, CA 94612 Made in the U.S.A.

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 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.*

Name: _____

Period _____

A MEMO WRITING SCORING GUIDE

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

Comments: