

Hazardous Waste

Before you Begin

Waste is considered to be hazardous if it exhibits one of the following properties - ignitability, corrosivity, toxicity or reactivity. The properties of these wastes make them potentially hazardous for humans and the environment. These wastes can either be by-products of manufacturing processes (as in devices like CFLs) or simply discarded commercial products, like cleaning fluids or pesticides.

These wastes can be found in different physical states - gaseous, liquids, or solids. It is important to be careful with hazardous waste as it is a special type of waste and should not be disposed off the ways we dispose by-products of our everyday life.

Do our households have hazardous wastes? Do we realise that the day-to-day chemicals we use at households are potentially hazardous in nature? Some of the chemicals used at homes are hazardous in nature, it is important to identify these and identify potential alternatives where possible.

What classifies as potential household hazardous wastes? There are many. The resources provided with the lesson plans will help identify some of these. It is important to first recognise a product as a potential hazardous waste. The resources provided in this lesson plan also help one understand the meaning and interpretation of these symbols. To start with it is important to know that hazard symbols on products have three parts (refer to reference chart under resources for more information):

1. the picture
2. the frame
3. the caution (signal) words underneath the image



POISON

Dangers of household hazardous products

- Mixtures of some hazardous products can produce dangerous vapours, explosions or fires.
- Products containing acids can burn the skin, eyes or respiratory tract.
- Exposures to solvents and pesticides can cause nausea, headaches, convulsions, etc.
- Repeated exposures to chemicals can cause cancers.
- May cause incidences of poisoning in infants or pets.
- Environmental damage by pesticides - along with killing some pests, they also cause a lot of harm to other beneficial insects including butterflies.

It is thus imperative to reduce hazardous waste products at home

- Be a smart shopper and buy only what you require.
- Look at the product labels carefully and find out if there are less toxic alternatives.
- Follow all the safety instructions while handling the product, while storing the same and also responsibly dispose it.
- Use alternative non-toxic home based products where possible.

Green Cleaners



INTRODUCTION

Green cleaners refers to using methods and products with environmentally friendly ingredients and procedures that preserve human health and environmental quality. As the association of hazardous chemicals with health is becoming clearer, demand of safer materials which are environmental friendly and do not have any adverse health impact is increasing.

The lesson encourages exploratory research and synthesis of learning from around the world.

Objectives:

Students will be able to

- survey the immediate community to ascertain the use of hazardous/ safer household products.
- identifying safer substitutes for common hazardous household products.
- popularise the use of these alternatives, by first implementing their use in schools and promoting awareness of the same amongst students and through them to parents.
- communicate learnings through an article/brochure.

YRE steps: Investigate, Research Solution, Report, Disseminate

Curriculum Linkage: Science/ Environmental Studies/Social Science



11-14
Years

Time required/ Duration:

- **Classroom Session 1:** 45 minutes for the teacher to do a background introduction on household hazardous wastes and why we need to be careful while handling and disposing these.
- **Home Assignment 1:** Five hours over a week for the community survey and internet search.
- **Classroom Session 2:** 45 minutes for group presentations and wrap up session.
- **Home Assignment 2:** One week for trying out some of the household greener products.
- **Classroom Session 3:** 90 minutes for developing a brochure.

Resources Required:

- Resource 1: Hazardous waste products and labels powerpoint presentation
- Resource 2: Hazardous waste symbols reference chart - to understand and interpret reading of labels
- Community Hazardous waste - survey sheet
- Internet
- Writing materials



Activity

Classroom session

1

- Start with a discussion introducing students to the different types of products consumed at home for various requirements including cleaning, personal care, pest control to name a few and mention that a range of products are available in the market for these functions.
- Lead the discussion so that students understand that some of these products are potentially hazardous and appropriate care needs to be taken while handling and disposing them.
- Discuss the home assignment.

Home Assignment

1

- Guide the students to use the community hazardous waste survey sheet to assess the different types of chemicals people are using in their households and if any of them are using less harmful alternatives to these hazardous products.
- Suggest that each student should survey two households - one could be their own.
- Encourage students to undertake an internet based search or interact with individuals who could teach them how to make some alternatives instead of some of the hazardous chemicals presently used.
- Allocate one week time to the students to undertake these surveys and internet based research.

Classroom session

2

- Ask students to summarise their findings in the class.
- Discuss the findings.
- Ascertain as part of the student survey, if students came across some innovative products which could be used instead of household hazardous products.

Home Assignment

2

- Ask students to make some of the alternatives identified in the research for use at school and homes.
- One week should be provided to the students for the same.

Activity

Classroom session 3

- Ask students to create an A-4 size brochure explaining the demerits of hazardous household chemicals, mentioning the benefits of alternative green products and popularise the use of alternative products that they researched.
- Share and disseminate the brochure using social media, school bulletin board and other community spaces.

Evaluation:

Evaluate the brochure developed by the students for the effectiveness of communicating the following

- The demerits of hazardous waste
- The benefits of alternative products
- Promotion of their product
- Photographs or other elements they would have made use for effective communication

Taking Action



INTRODUCTION

Action competence is an important aspect of any educational programme. Raising awareness and mobilising action is an important citizenship aspect. This lesson plan engages students on the issue of disposal of hazardous waste.

Objectives:

Students will be able to

- investigate and find out the local and national Household Hazardous waste collection programme.
- research and find out the nearest household hazardous waste drop off location.
- design a campaign to inform the immediate community about the drop off locations for the collection of hazardous waste.
- write about your efforts to the local newspaper.

YRE steps: Investigate, Research Solution, Report, Disseminate

Curriculum Linkage: Science/ Environmental Studies/Social Science

Time required/ Duration:

- **Classroom Session 1:** 45 minutes (15 minutes for the teacher to do a background introduction on household hazardous wastes and why we need to be careful while handling and disposing these and 30 minutes for the group activity with students for identifying local and national efforts for managing household hazardous wastes and identify different locations which collect hazardous waste locally).
- **Group Assignment 1:** 45 minutes for group discussions so students could plan out the awareness material for the week long hazardous waste collection drive.
- **Group Assignment 2:** One week for preparing the awareness material for the drive and two days for students to put together their experiences in the form of a newspaper article.

Resources Required:

- Large chart paper
- Markers, crayons, other coloring tools
- Old magazines and glue for collages (optional)
- Paper and other student stationery
- Cartons/ bins/ othe material for designing different material for promoting the drive
- Internet connection



Young Reporters
for the environment

15-18
Years



Activity

Classroom session **1**

- Start with a discussion introducing students to the different types of products consumed at home for various requirements including cleaning, personal care, pest control to name a few and mention that a range of products are available in the market for these functions. The waste products and labels powerpoint presentation should be made use of for the same.
- Lead the discussion so that students understand that some of these products are potentially hazardous and appropriate care needs to be taken while handling and disposing them.
- During the background introduction, discuss with students the importance of the different household hazardous chemicals collection points or any laws that might be in place for the same in their city/ country.
- Provide students time to research and identifying local and national efforts for managing household hazardous wastes and identify different locations which collect hazardous waste locally.

Group Assignment **1**

- Divide the students in groups of 3-4. Each group should choose one type of product listed in the resources.
- Using the poster paper, markers, magazine cut-outs, and the internet as an additional research tool, ask each group to create an informative poster about safe disposal of that product.
- Each poster should include the following information in their posters:
 - Examples of product and its main ingredients.
 - Types of hazard (Reactive, Toxic, Corrosive, Ignitable) and
 - Best disposal method and where to take it in their community
- Once completed, groups can present their poster to the class and take a feedback.
- Students should then design a campaign – posters.

Group Assignment **2**

- Guide students to go around the immediate community and spread the message with the help of the posters that they have developed.
 - Common areas like parks and shopping malls could be possible areas which should be targeted for community awareness.
- Ask the students to interact with the community and identify one appropriate location where the household hazardous waste could be collected during the campaign period. They will also have to identify volunteers from within the community who will take charge of this collection and ensure it is routed out for recycling efficiently.
- At the end of their campaign, ask students to write an article to the local newspaper about their achievements.
- Allocate one month for all these tasks.

Activity

Evaluation:

- The feedback to the students as part of the poster presentation in class will be an important way to evaluate the student understanding.
- The success of the campaign can be evaluated based on the quantity of hazardous waste collected.

Resource 2

Hazardous waste table

Sl. No.	Product category	Hazardous category mentioned on the products		
		Hazardous symbol picture	Hazardous symbol frame	Signal words
1	Household cleaners - soaps, detergents, anti stain liquids, disinfectants, floor cleaners and drain openers			
2	Lawn and garden products			
3	Oil-based stains, paints and varnishes			
4	Latex and oil based paints			
5	Thinners and other solvents			
6	Glues and Adhesives			
7	Automotive products			
8	Batteries - household and car			
9	Antifreeze			
10	Inflammable liquids			
11	Household pest control liquids and other hazardous traps			
12	Mercury containing Thermometers, CFLs, etc			
13	Hair care and body care products including beauty care			
14	Watch and Torch batteries and cells			
15	Swimming pool chemicals			

Resource 3

School Hazardous waste - survey chart

School survey team	Products found in use on school campus	Hazardous category mentioned on the products		
		Hazardous symbol picture	Hazardous symbol frame	Signal words
School gardens team				
School sanitation and hygiene team				
School cafeteria team				
Others				

Resource 4

Community Hazardous waste - survey sheet

Areas within homes where different products are used	Products found in use on school campus	Hazardous category mentioned on the products			Alternative products (if any are used)
		Hazardous symbol picture	Hazardous symbol frame	Signal words	
Gardens					
Kitchen					
Sanitation at home (toilets, kitchen sinks, floor cleaning, etc					
Pest management within homes					
Gums and adhesives					
Personal hygiene and beauty products					
Others					

References

<http://www.hazwastehelp.org/educators/lessons.aspx>
<https://www.canada.ca/en/health-canada/services/home-safety/household-chemical-safety.html>
<https://swa.org/183/Household-Hazardous-Waste-Symbols>
<http://neerivis.nic.in/faqs.html>
http://www.ct.gov/deep/cwp/view.asp?a=2708&q=323956&deepNav_GID=1763%20
<http://www.rethinkwasteproject.org/hazardous-waste/hhw-alternatives/>
https://www.epa.ie/pubs/reports/waste/haz/HSA_EPA_Hazardous_Waste_Guidance_CAS.pdf