Welcome to the Household Hazardous Waste Learning Trunk and to the treasures inside…

We use household hazardous products every day in cleaning and fixing our homes, maintaining our cars, and taking care of our lawns. Products such as oil-based paint, weed killers, and drain opener are okay when we use them up for the job they were intended, but if these products are *not* properly used, stored, and disposed of, they can present a hazard to our health and our environment.

This Household Hazardous Waste (HHW) Learning Trunk and its contents will help educators (both formal and nonformal) explain the importance of proper use, storage, disposal, and safety information of household hazardous products. This trunk also offers activities and lesson plans that will help students identify household hazardous products and read product labels; learn how hazardous products can affect their health, and identify signal words to determine the least hazardous product.

Contents of trunk

The complete contents of this trunk are itemized in *Items in the Household Hazardous Waste Learning Trunk* on pages 1 and 2. After using the trunk, please repack all items in their appropriate places within the trunk before returning it. If anything is missing or damaged, please call the Office of Environmental Assistance at 651-296-3417 or 1-800-657-3843 so we can replace it.

Lesson plans and appendix

Once you begin to explore the contents of the trunk, you'll find that you may need some guidance as to how to use the materials and props within it. These lesson plans and appendix offer you options to use in educating your students. The lessons are divided into four categories (*Household hazardous products – what are they and how do they affect the environment and me?, Read the Label, Proper Usage,* and *Specific Products*). They are written for the fourth through sixth grades, although with a little adaptation, many of the lessons may be used with younger or older students or adults.

The lesson plans may be used singly or as a progression of learning. They are appropriate for both nonformal education situations, such as clubs, exhibits, youth groups and meetings, and for formal education, such as schools. Each plan contains:

1. The time needed to prepare and complete the activity or activities.
2. The materials needed to do the activities.
3. Vocabulary words used in the lesson.
4. The goal and objectives of the lesson.
5. Topical background information for the educator.
6. Directions for one or more activities and possibly an enrichment activity.
7. A list of related lesson plans.

You may also use the materials in the trunk as learning stations. Many of the trunk's props and materials lend themselves to self or group exploration. Thank you for taking the time to learn and teach others about the impacts of household hazardous products and their waste. Enjoy the trunk

Further information

The Household Hazardous Waste Learning Trunks are the property of the Household Hazardous Waste Program. For further information regarding the HHW Learning Trunk and Minnesota's household hazardous waste program, contact the Office of Environmental Assistance (OEA) at 651-296-3417.

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Table of Contents

Items in the Household Hazardous Waste Learning Trunk

After using the trunk, please repack all items in their appropriate places within the trunk before returning it. Please alert us if anything is missing so we can replace it.

Guidebook to the HHW Learning Trunk (in 3-ring binder)

Display boards

1. 11"x17" Protect Your Family and the Environment.
2a-2b. two 17"x20" bifold boards, Where to Find Household Hazardous Products in the Home and Garden (use with 56 miniature products in the blue-topped show-off container)
3. 8 ½"x11" (pathways to) Ground Water
4. 8 ½"x11" Signal Words Can Help You Decide: Caution and Warning
5. 8 ½"x11" Signal Words Can Help You Decide: Danger and Poison
6. 11"x17" Do I Need to Wear Safety Goggle or Protective Clothing?
7. 11"x17" Human Body Exposure Pathways
8. Game, 16"x16" Exposure Pathways Bingo
9. 11"x17" Read the Label
10. 11"x17" Read the Label to Use Products Safely
11. 11"x17" Before Choosing a Product, Read the Back Label Carefully
12. 11"x17" Look for Signal Words on Product Label and Choose the Least Hazardous Product
13. 11"x17" (picture of a family reading labels)
14. 11"x17" Choose the Least Hazardous Product. Buy Only What You Need.
15. 8 ½"x11" Which Product Should I Use?
16. 8 ½"x11" Can It Be Used Near Children and Pets?
17. 8 ½"x11" Do Not Mix Different Types of Products Together!
18. 8 ½"x11" Can It Be Used Indoors? Do I Need Ventilation?
19. 8 ½"x11" Make Sure Lids and Caps Are Tightly Sealed.
20. 8 ½"x11" Store Hazardous Products Carefully.
21. 8 ½"x11" Keep Out of Reach of Children.
22. 8 ½"x11" When You Can't Use It Up
23. 20"x17" The Water Cycle
24. 20"x17" How Do We Abuse…the Same Water We Use?
25. Game, 16"x16" Disposal Game
26. 8 ½"x11" Do Not Put Hazardous Materials into Food Containers or Unlabeled Containers

White-topped square plastic pail

1 quart water
1 quart vinegar
1 box baking soda
1 package litmus paper
1 set measuring spoons
3 plastic one-quart containers
6 wooden stands (for display boards)

Blue-topped show-off container

Items to be used with display boards

- 12 product look-alike cards in manila envelope, 4"x6": What Is That? – Product Look-alikes.

Sports drink	Windshield washer fluid	Candy	Moth balls
Syrup	Oil	Breath mints	Medicine
Soda pop	Lemon scented cleaner	Apple juice	Pine cleaner

- Extra Velcro dots in the product look-alike manila envelope
- 2 laminated Bingo cards for Game Board 8: Exposure Pathways Bingo
- Laminated sheet of 56 miniature hazardous household products to Velcro on the bifold display boards (2a-2b) of home, garage, and garden
- Extra laminated sheet of 56 hazardous household products to use with bifold display boards (2a-2b)
- Disposal Guide for Household Hazardous Waste postcard
- A Checklist for Storing Household Chemicals postcard
- *How to reduce toxic chemicals in your home* brochure

Teacher aids

- Chemicals Choosing Wisely: 1 teacher resource guide and 5 student books
- The Rechargeable Battery Recycling Corporation Battery Lesson Plan
- *Safe Home, Clean Earth* – Minnesota Extension Service Educational Packet
- The Disposal Guide to Household Hazardous Wastes – Lake Watch
- CD: *Unintended Consequences* – songs by Stan Slaughter
- CD: *Roots of Hazard*
- Video/booklet – EPA – *E. Hazards: They're Out There*

Sample product props

There are 12 household hazardous product containers, which are to be used as props with the lesson plans.

½-quart plastic containers

• BLASTO Drain Opener	Poison	cleaner
• SIX GUN Garden Herbicide	Warning	pesticide

Aerosol cans

• SCUDS AWAY Flying Insect Killer	Caution	pesticide
• CRUD-OFF Oven Cleaner	Danger	oven cleaner
• PAINT RIGHT Oil Paint	Danger	paint
• HOLD TIGHT Hair Spray	Warning	

Shaker can

• GO GET 'EM Fungicide	Danger	pesticide

Spray bottle

• EASY CLEAN Oven Cleaner	Caution	oven cleaner

1-quart oblong can

• BE GONE Paint Stripper	Poison	
• RISE & SHINE Furniture Polish	Danger	

Round quart can

• PAINT RIGHT Oil Paint	Warning	paint
• GRECIAN URN Latex Paint	Caution	paint

Lesson Plan 1: What are household hazardous products and where do you find them?

Grade Level

Grades 4 to 6

Time needed

Prep: 15 minutes
Activity: 30 minutes

Materials & Props

- 56 miniature products with attached Velcro (in blue-topped show-off container)
- Bifold display board 2a-2b – hinged home and garden
- Display boards 20 and 21

Vocabulary

See Vocabulary list in appendix for definitions.

environment
household hazardous product
household hazardous waste (HHW)
signal words

Goal

Students will be able to identify household hazardous products and describe where they can be found around the home.

Objectives

Students will:

- Identify at least three household hazardous products.
- Identify at least three locations where household hazardous products are commonly found in and around the home.

Information

- A household hazardous product is a chemical product that is used in and around the home.
- A household hazardous waste is a chemical that is no longer usable or not intended to be used.
- Unless specifically stated, the term household hazardous product in these lesson plans is used to mean any potentially hazardous chemical around the home, even if it is technically considered a household hazardous waste.
- Since most homes presumably have more usable chemicals than waste chemicals, we have chosen to use the term household hazardous product to mean all chemicals found in the home.
- To distinguish household hazardous products from other products used in and around your home, read the label. A household hazardous product has one or more of these words (often called signal words) on the label: *caution*, *warning*, *danger*, or *poison*. Other words include flammable, reactive, corrosive, or toxic. See the vocabulary list in the appendix for definitions of these words.
- Household hazardous products can commonly be found in a variety of places around the home, including:
  - the kitchen (under the sink)
  - laundry area
  - bathrooms (medicine cabinet, cupboards)
  - basement and storage areas
  - hobby or craft area

Activity

Set up display boards 2a-2b, 20, and 21 in wooden display board stands.

Using bifold display boards 2a-2b of the home and garden and the 56 miniature products:

1. Ask students where household hazardous products might be found or used in and around the home. Ask students to name a location and give an example (e.g. a bathroom may have medicines or cleaners).
2. Students take turns sticking the miniature products onto appropriate places in and around the home and garage on the bifold display boards 2a-2b and explain why they put them there. Teacher leads discussion: “Is this the only place where the product is found?” and “Is this the safest place to find the product?”
3. Discuss with the students the possible hazards if household hazardous products are not used or stored properly. Ask them what they would do to keep household hazardous products out of reach of small children. For example, if storage cabinets are not locked, small children could open the products and be poisoned or burned.

Enrichment Activity

Students may cut small pictures of household hazardous products from magazines and advertisements to augment the 56 miniature products. Extra Velcro dots are in the product look-alike manila envelope in the blue-topped show-off container.

Related Lesson Plans

📖 Lesson Plan 3: Ground Water
📖 Lesson Plan 11: Proper Storage

Lesson Plan 2: The Water Cycle

Grade Level

Grades 4 to 6

Time needed

Prep: 10 minutes
Activity 1: 20 minutes
Activity 2: 30 minutes

Materials & Props

- Display boards 23 and 24

Vocabulary

See vocabulary list for definitions.
condensation
evaporation
ground water
percolation
surface water
water cycle
water vapor

Goal

Students will understand the water cycle and that all living things use and reuse the same water.

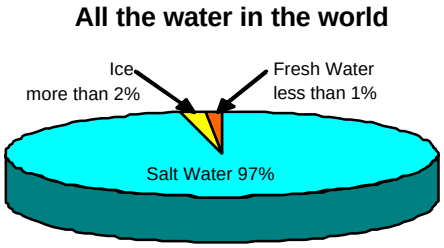
Objectives

Students will:

- Define evaporation, condensation, and water vapor.
- Demonstrate the water cycle in its simplest form.
- Explain the difference between ground water and surface water.
- Show how pollutants get into the ground water.
- Explain why it is that we all use the same water.

Information

- Approximately 80% of the Earth's surface is covered with water.
- 97.5% of water on the Earth is saltwater; and 2.5% is fresh water.
- Only 1% of the water on Earth is fresh water *and* available for our use.
- Almost 2% of the fresh water on Earth is frozen in glaciers.
- In the United States, ground water makes up 95% of the nation's fresh water resources.
- One half of the people in the United States use ground water for their drinking water.
- Today, we have approximately the same amount of water as when the Earth was first formed. The Earth will not get any more water, which makes it important to conserve water.



- A dinosaur may have drunk the water you are drinking now.
- The average family in the United States uses 80 to 100 gallons of water per person per day.
- Flushing a toilet uses 5 to 7 gallons of water.
- Leaving the faucet run while brushing your teeth uses approximately 2 gallons of water.

Activity 1

Using display board 23: *The Water Cycle*, explain that water moves in a continuous cycle in the environment and that we all use and reuse the same water.

1. Surface water (a liquid) evaporates from the sun's heat and becomes water vapor (a gas) in the atmosphere.
2. Through the process of condensation, which is caused by cooler temperature, water vapor changes into water.
3. When water vapor condenses, it falls back to Earth again as rain, sleet, snow, or hail and begins the cycle again.
4. When rain, sleet, or snow falls on soil, some of it percolates through the soil and becomes ground water.
5. Ground water can surface at a spring or flow into a river or stream where evaporation can occur, starting the entire cycle over again.
6. After showing the display board, have the students act out the water cycle in groups or as individuals.

Activity 2

Using display board 24: *How Do We Abuse…the Same Water We Use,* discuss how surface and ground water can be contaminated. Have the students explain what is wrong in this display board and what they would do to correct it. The key to display board 24 is in a sleeve in the appendix. This activity can also be included in Lesson Plan 3: Ground Water.

Related Lesson Plans

📖 Lesson Plan 3: Ground Water
📖 Lesson Plan 12: Proper Disposal
📖 Apple of Our Eye Teacher Information available at http://www.fsec.ucf.edu/ed/SM/ch6-solarme/appleeye-teacher.htm.

Lesson Plan 3: Ground Water

Grade Level

Grades 4 to 6

Time needed

Prep: 20 minutes
Activity 1: 15 minutes
Activity 2: 30 minutes
Activity 3: 15 minutes

Materials & Props

- Display boards 1, 3, and 24
- 1 quart clear container

Additional materials:

- ¼-inch gravel rocks
- Turkey baster
- Water
- Green food coloring
- Cup

Vocabulary

See vocabulary list for definitions.

bioaccumulate
contaminate
food chain
ground water
leachate
nonpoint source pollution
point source pollution
septage
water treatment plant

Goal

Students will understand ground water and the pathways to it.
Students will know how water is polluted by the incorrect disposal of household hazardous wastes.

Objectives

Students will:

- Explain three differences between ground water and surface water.
- Demonstrate three ways pollutants can get into surface and ground water.
- Describe the concept that all living things are connected by water.

Information

- A single identifiable source of pollution, like household hazardous waste dumped into a storm sewer, is called point source pollution.
- Dumping household chemicals into a storm sewer has the same effect as dumping them directly into a lake or river.
- If the pollution source cannot be identified and is often carried by wind or water, it is called nonpoint source pollution.
- A well is a direct pathway to ground water.
- Mercury is an example of a material that will bioaccumulate in the muscle tissue of living beings. Mercury in air pollution can be deposited in surface water or settle in the bottom sediments of rivers and lakes. There, it breaks down into methylmercury, which is then consumed by tiny animals and plants. They, in turn, are eaten by minnows, which are preyed on by larger fish, and the larger fish by still older and larger fish. Each time, mercury accumulates in the protein of fish tissues. The larger fish are then eaten by animals and humans, and again the mercury accumulates in their muscle tissue.
- The eating of smaller organisms by successively larger organisms is called the food chain.
- Few, if any, chemicals are removed from water as it moves through a water treatment plant. Therefore, the disposal of chemicals down the drain or flushing in a toilet simply moves the chemicals from one place to another.

Activity 1

Using display board 1: *Protect Your Family and the Environment,* display board 3: *Pathways to Ground Water,* and display board 24: *How Do We Abuse…:*

1. Discuss how household hazardous products affect the environment and us – improper disposal methods and their resulting environmental impacts.
2. Discuss the ways in which household hazardous products can reach ground water. Explain that the purpose of storm sewers is to carry rainwater to lakes or rivers to avoid flooding the streets. Show that storm sewers flow directly into a lake or river. Therefore, do not pour anything into a storm sewer.

Activity 2

Using a ground water model, describe how a landfill or septic system can leak into the ground water. To make a ground water model, follow the instructions below. This may be made beforehand or as an in-class activity with the students.

1. Fill a clear one-quart container with clean ¼-inch gravel rocks.
2. Cover the rocks with water. The pore spaces between the rocks represent the aquifer where water is stored in the ground.
3. Use a turkey baster to draw water off the bottom of the container. The turkey baster simulates a well.
4. In a separate cup, mix 2 drops of green food coloring in ½ cup of water.
5. Pour the colored water into the water-filled rock container.
6. Again draw off water from the bottom of the container with the turkey baster. What color is the water? How many draws did it take to get that color?

Discussion

- If leachate from landfills and septage from septic systems leak into ground water, where can they go? (*They can be drawn up into your drinking water through the well.)* Is it important to build landfills and septic systems correctly? Why? (*So that they don't contaminate the ground water.)*
- Which is easier? To keep water clean in the first place or to clean it up after it is polluted?
- Which is easier? To clean pollutants from surface water or from ground water? *(Surface water is more accessible than ground water.)*

Activity 3

Using display board 24: *How Do We Abuse…*, discuss how surface and ground water can be contaminated. Have the students explain what is wrong in this display board and what they would do to correct it. This activity may also be used with Lesson Plan 2: The Water Cycle.

Related Lesson Plans

📖 Lesson Plan 2: The Water Cycle
📖 Lesson Plan 9: Proper Use
📖 Lesson Plan 11: Proper Storage
📖 Lesson Plan 12: Proper Disposal

Lesson Plan 4: Exposure Pathways: How do chemicals enter your body?

Grade Level

Grades 4 to 6

Time needed

Prep: 15 minutes
Activity 1: 20 minutes
Activity 2: 30 minutes

Materials & Props

- Display board 7
- Game board 8: Exposure Pathways Bingo
- Bingo game cards in the appendix
- GO GET 'EM Fungicide
- CRUD-OFF Oven Cleaner
- BE GONE Paint Stripper

Additional materials:

- Chips or small pieces of paper for Bingo

Vocabulary

See vocabulary list for definitions.
absorption
contact
exposure pathways
household hazardous products
ingestion
inhalation

Goal

Students will know the four pathways that household hazardous chemicals can enter the body. Students will understand the need to read and follow directions on product labels before use.

Objectives

Students will:

- List the four pathways that household hazardous products can enter the body.
- Name three reasons why household hazardous products should be used and handled with care.
- Explain why reading the label and following label instructions is important.

Information

Household hazardous products can be harmful not only to the environment if improperly disposed of, but also to humans and animals. The ways that chemicals enter the body are called *exposure pathways.* The four exposure pathways are *contact*, *absorption*, *ingestion*, and *inhalation.*

- **Contact:** Many chemicals can harm you just by getting on your skin, in your eyes, or in your nose or throat. They can irritate or burn the exposed surfaces. Liquids can splash on you if they are spilled. Many labels say "avoid skin contact" or "wear rubber gloves," or "wash hands after use" to warn people about contact injuries.
- **Absorption:** Absorption occurs when a substance enters your body through the pores in your skin. Your skin is like a sponge – it can absorb harmful chemicals, which pass through the protective layers of skin and into the bloodstream. People frequently overlook this exposure pathway because it often does not have an immediately noticeable effect.
- **Ingestion:** When you eat or drink something, you ingest it. It goes from your mouth, down your esophagus, and into your stomach and intestines. From the stomach or intestines, the poisons can enter the bloodstream and be carried to all parts of the body. Some harmful chemicals can stay in the body for a long time.
- **Inhalation:** Inhalation is the same as breathing. You can breathe in harmful vapors or fumes when liquids evaporate. You can also breathe in the harmful mist from aerosol sprays. From the nose or mouth, the vapors go into the lungs and then into the bloodstream. The blood carries the harmful chemicals to all parts of the body. For example, when people use aerosol cleaners, they may notice that they start coughing; this may be a result of inhaling chemicals from the aerosol. Look for the words "use only in a well-ventilated area."

Activity 1: What are the exposure pathways into the body?

Using display board 7, *Human Body Exposure Pathways*, describe how household hazardous products can get into the body. Also discuss the name for each pathway.

1. Stress why it is important to read the label and follow label instructions.
2. Compare the three products, GO GET 'EM Fungicide, CRUD-OFF Oven Cleaner, and BE GONE Paint Stripper. What type of exposure pathway is listed on each product? Does the type of container tell you if there is a risk in using the product? How would you protect yourself when using each product?

Activity 2: Exposure Pathways Bingo

After the class has completed Activity 1, play Exposure Pathways Bingo with game board 8 and the Bingo cards supplied in the appendix. Copy as many Bingo cards as you need for your students and use chips or small pieces of paper to cover Bingo spaces.

Use this key to explain each symbol on the spinner board and Bingo cards.

Body part	**Represents this exposure pathway:**
Hand (skin)	Absorption and contact
Heart (blood)	Absorption
Eye	Contact
Nose	Contact and inhalation
Mouth	Ingestion and inhalation
Stomach	Ingestion
Lungs	Inhalation
Skull and crossbones symbol	Either spin again, choose a pathway, or have students remove a chip from one space that has already been covered.

To play:

The dealer spins the spinner and calls out the exposure pathway under the arrow. If a symbol represents more than one pathway, the dealer decides what pathway to call out. Players can cover one or all body parts representing that pathway (decide before play starts). The dealer continues to spin until one player yells *BINGO* by having an entire row, column, or diagonal set of body parts covered.

Related Lesson Plans

📖 Lesson Plan 5: Read the Label: Signal Words
📖 Lesson Plan 6: Read the Label: Product Characteristics
📖 Lesson Plan 10: Don't Mix

Lesson Plan 5: Read the Label: Signal Words

Grade Level

Grades 4 to 6

Time needed

Prep: 15 minutes
Activity: 20 minutes

Materials & Props

- Display boards 1, 4, 5, and 12
- All product samples
- *How to reduce toxic chemicals in your home* brochure

Additional materials:

- Notebooks
- Pencils

Vocabulary

See vocabulary list for definitions.
caution
characteristic words
danger
poison
signal words
warning

Goal

Students will understand the importance of reading label information.

Objectives

Students will:

- Define signal word.
- List the four signal words in order of most hazardous to least hazardous.
- Determine the level of hazard of two products by signal word.

Information

- Many household products could harm children, adults, pets, or the environment if not used, stored, or disposed of correctly.
- Signal words on the label show the product's degree of hazard – how toxic or hazardous a product is. Signal words are required by law to be on the labels of hazardous products.
- **Signal words** from least hazardous to most hazardous:
  Caution – mildly to moderately hazardous (not fatal if swallowed but the product may irritate the skin or make a person sick)
  Warning – moderately hazardous
  Danger – extremely hazardous, i.e. extremely flammable, corrosive, or highly toxic
  Poison – highly toxic (harmful or fatal if swallowed)
- **Characteristic words** are terms that further describe the type of hazard. They include the terms *flammable, inflammable, protect from heat, corrosive, may cause burns, toxic, reactive, eye irritant,* and *skin irritant* (see Lesson Plan 6: Read the Label: Product Characteristics).

Activity

Use the display boards 1, 4, 5 and 12, and product examples contained in the trunk.

Using display board 12, emphasize that signal words can help us to decide which product is least hazardous.

1. Have the students find and record the signal words on two product labels.
2. Using the display boards as a reference, have the students record the level of hazard on the product based on the signal word. Is it a low level hazard or high level hazard?
3. Comparing the two products they recorded, discuss which product they would use and why they came to that decision.
4. Ask the students if there are other low level hazard products that could be used. (Refer to *the How to reduce toxic chemicals in your home brochure* in the blue-topped show-off container.)

Enrichment Activity

As a take-home exercise, instruct students to read labels on products found in their homes, with the guidance of their parents, and fill out the Home Hazardous Products Survey in the appendix. Students can report back on which signal words they found. Students could also note where and how the products were stored and discuss problems with improper storage (refer to Lesson Plan 11: Proper Storage).

Related Lesson Plans

📖 Lesson 6: Read the Label: Product Characteristics
📖 Lesson 9: Proper Use
📖 Lesson 11: Proper Storage

Lesson Plan 6: Read the Label: Product Characteristics

Grade Level

Grades 4 to 6

Time needed

Prep: 15 minutes
Activity: 30 minutes

Materials & Props

- Display boards 1, 4, 5, 9, 10, 11, 12, and 13
- All product samples

Vocabulary

See vocabulary list for definitions.

caution
characteristic words
combustible
corrosive
danger
flammable
petroleum distillates
poison
signal words
toxic
warning

Goal

Students will be able to identify hazardous products through signal words and characteristics of products.

Objectives

Students will:

- Name four hazardous characteristics found on product labels.
- Name three other words that mean flammable.
- Identify three other words that mean corrosive.
- Define the difference between the four signal words and hazard characteristics.

Information

All hazardous consumer products should have signal words on the label. Signal words indicate the product's degree or level of hazard (see Lesson Plan 5).

Characteristic words indicate the *type* of hazard posed by a product and are usually found after the signal word on the label. The following terms are characteristic words:

- ***Flammable/Combustible:*** The words *flammable, combustible, ignitable, keep away from sources of heat, flame or spark,* or *contains petroleum distillates* means that the product can easily catch fire and support a flame.
- ***Corrosive:*** The words *corrosive, acid, caustic, lye, alkaline, or causes burns to skin* mean that the product can burn the skin or eyes. This material can also eat away other materials with which it comes into contact.
- ***Toxic:*** The words *poison* or *harmful if swallowed* mean that the product is poisonous and can be harmful or fatal if swallowed (ingested), inhaled, or absorbed through the skin.
- ***Reactive:*** The words *do not mix with…* or *store separately from other products* mean that the product may react violently or produce toxic gas if combined with other substances. Examples include certain types of drain cleaners, oven cleaners, or other products containing bleach, ammonia, or lye.

Always keep products in original containers. If you throw away the original container, you throw away important information on safety, storage, first aid, and where to call for more information.

Activity

1. Using product samples, discuss the signal words and characteristics of hazardous products and how they differ from one another based on the hierarchy of most hazardous to least hazardous.
2. Discuss the importance of the other important information contained on the label. Labels tell you:
   - if the product has hazardous characteristics.
   - how to use a product safely and effectively.
   - what type of personal protective equipment to wear, such as safety glasses or gloves.
   - where it is safe to use the product, for example, in a well-ventilated area.
   - how to store the product properly and to maintain its usefulness. This ultimately reduces waste that would require special disposal.
   - first aid instructions.
   - phone numbers to call for more information about the product.
3. Have students find the signal word and determine the hazard characteristics on the sample products:

   - HOLD TIGHT Hair Spray

     Answer: The signal word is *warning*. The hazard characteristic is flammable. Other examples of flammable products may include aerosol cans, paint thinner, oil-based paint, kerosene, gasoline, and nail polish remover.

   - RISE & SHINE Furniture Polish

     Answer: The signal word is *danger*. The hazard characteristics are combustible and toxic. The words "Harmful or fatal if swallowed" on the back label indicate that the product is toxic. Other examples of toxic products may include antifreeze, pesticides, paint stripper, motor oil, wood preservatives, and spot removers.

   - BE GONE Paint Stripper

     Answer: The signal word is *danger*. The hazard characteristic is toxic. The label reads "Poison." The words "Do not store near heat or display in windows" may indicate that the product is also flammable. Other examples of toxic products may include antifreeze, pesticides, paint stripper, motor oil, wood preservatives, and spot removers.

   - BLASTO Drain Opener

     Answer: The signal word is *poison*. The hazard characteristics are toxic and corrosive. The words "Poison: May be fatal or cause permanent damage if swallowed" indicate that the product is toxic. Other examples of toxic products may include antifreeze, pesticides, paint stripper, motor oil, wood preservatives, and spot removers. The words "Contains sodium hydroxide (caustic lye)" indicate that the product is corrosive. Other examples of corrosive products may include drain opener, oven and toilet-bowl cleaners, battery acid, and concrete cleaner.

Related Lesson Plans

📖 Lesson 5: Read the Label: Signal Words
📖 Lesson 7: Read the Label: Emergency Information
📖 Lesson 9: Proper Use

Lesson Plan 7: Read the Label: Emergency Information

Grade Level

Grades 4 to 6

Time needed

Prep: 15 minutes
Activity: 30 minutes

Materials & Props

- Display boards 10, 19, and 26
- CRUD-OFF Oven Cleaner
- BLASTO Drain Opener
- RISE & SHINE Furniture Polish
- BE GONE Paint Stripper

Additional materials:

- Local phone book

Vocabulary

See vocabulary list for definitions.
caution
danger
label
poison
poison control centers
signal words
warning

Goal

Students will be able to read product labels for safe use. Students will know proper emergency procedures if household hazardous products are handled improperly.

Objectives

Students will:

- Find and determine label instructions for safe use on at least two products.
- Explain why all containers must be properly labeled.
- Locate emergency medical information on the product labels of at least two products.
- Describe how to access a poison control center and emergency medical personnel, if needed.

Information

- All household hazardous products have important information on the label that states safety considerations and emergency medical information.
- More than a million people call poison control centers each year about child poisonings.
- Poison control centers are staffed 24 hours a day, 7 days a week.
- Write the 1-800 telephone number for your poison control center from the inside cover of your phone book here:

  _____

Activity

Set up display board 10 and the four product samples listed (CRUD-OFF, BLASTO, RISE & SHINE, and BE GONE). Have the students think about the question, "What is the first step in safe use and proper handling of household hazardous products?"

Answer: Read the entire label before using the product and always follow the label instructions.

1. Have the students read the labels of the four products, looking for specific instructions related to safe use.
   - CRUD-OFF: Wear rubber gloves. Keep out of reach of children.
   - BLASTO: Keep out of reach of children. Never mix with other chemicals. Do no use in garbage disposal or toilets.
   - RISE & SHINE: Do not use near flame or high heat. Use only with adequate ventilation. Avoid prolonged contact with skin and breathing vapors. Keep away from children.
   - BE GONE: Read entire label before using. Wear rubber gloves and protect eyes and skin from remover and its residue. If you have any form of heart trouble, use this product outdoors. Keep out of reach of children.
2. In reviewing the safe use information, what is the statement common to all four of the products? *Answer*: Keep out of reach of children.
   - Why is this important to do? *Because the signal words for these products are either danger or poison.*
3. Use display board 19. Why is it important to make sure lids and caps are tightly sealed?
   - Prevent leaks and spills of the product or its fumes.
   - Prevent the product from being opened by a young child.
   - Ensure that the product will maintain its effectiveness.
4. Use display board 26. Why should all containers be properly labeled?

   Because the first step in safe use is to read the label. Containers without labels are dangerous because the contents are unknown.
5. Read the four labels again looking for emergency medical information. What should you do if someone swallowed CRUD-OFF? BLASTO? RISE & SHINE? BE GONE?

   Notice that the answer for all of these products is similar, but slightly different. All *read do not induce vomiting*, while some also read *drink milk* or *drink water*. All the labels state to call a physician and two of the labels state to call the poison control center.
6. Look inside the front cover of your local phone book to find the phone number of the nearest poison control center.

Related Lesson Plans

📖 Lesson Plan 5: Read the Label: Signal Words
📖 Lesson Plan 6: Read the Label: Product Characteristics
📖 Lesson Plan 10: Don't Mix
📖 Lesson Plan 15: Product Look-alikes

Lesson Plan 8: Read the Label: Think before Buying

Grade Level

Grades 4 to 6

Time needed

Prep: 15 minutes
Activity: 30 minutes

Materials & Props

- Display boards 10-16, and 18
- HOLD TIGHT Hair Spray
- EASY CLEAN Oven Cleaner (aerosol)
- CRUD-OFF Oven Cleaner
- GRECIAN URN Latex Paint
- PAINT RIGHT Oil Paint (can)
- PAINT RIGHT Oil Paint (aerosol)

Additional materials:

- A pump spray bottle of hair spray
- For enrichment activity, poster board and markers

Vocabulary

See vocabulary list for definitions.
aerosol
corrosive
flammable
volatile
volatile organic compound (VOC)

Goal

Students will be able to discern the least hazardous products and make purchasing decisions accordingly.

Objectives

Students will:

- Recognize at least four hazardous products by using signal words found on product labels (review Lesson Plan 5).
- Compare at least three household hazardous products and decide which is least hazardous.
- Explain four factors to consider when purchasing household products, such as safety, alternatives, disposal, quantity, effectiveness, and level of hazard.
- Recognize that there are nontoxic alternatives to hazardous products.

Information

- Review the labels of the quart can of PAINT RIGHT Oil Paint, the aerosol can of PAINT RIGHT Oil Paint, and the quart can of GRECIAN URN Latex Paint, pump bottle of CRUD-OFF Oven Cleaner, and aerosol can of EASY CLEAN Oven Cleaner.
- **Latex paint** is a water-based product; it cleans up easily with water. Keep container closed so the paint does not dry out. Do not freeze.
- **Oil paint** contains petroleum distillates. Vapor may be harmful; combustible vapors and liquid. Use in well-ventilated area. For clean up, use mineral spirits in a well-ventilated area.
- **Oil-based paint in an aerosol can** contains acetone and toluene. Use in well-ventilated area, contents under pressure.
- **Aerosols** should be used only in well-ventilated areas. Occasionally, the nozzle will plug, preventing the user from getting the product out of the can. The resulting can must be disposed of as household hazardous waste. Aerosols no longer contain ozone depleting chemicals, but when a product is sprayed in an aerosol form, it is more easily inhaled into the lungs. The added chemicals that create pressure in the can are called propellants, and they can be flammable.
- Leftover paint, oven cleaner chemicals, and inoperable aerosol cans that still have product of any type inside them must be disposed of at a household hazardous waste collection or facility.

Activity

Using the props listed below, have the students complete the following tasks:

- Look for signal words on the labels of all containers: *caution, warning, danger,* and *poison.*
- Compare the signal words on all products. Which ones have the highest hazard level? *Answer:* The highest hazard would be the aerosol oven cleaner; the least would be the pump hair spray.
- Discuss which products are the most hazardous and why (see additional information below).
- Why do you wish to choose the least hazardous product to complete a task? *Answer:* The least hazardous product is safer for the person using the product and for the environment. Be sure to consider disposal methods when choosing a product.

Paint: Compare the signal words.

- PAINT RIGHT (aerosol can): Oil-based paint in the aerosol can is the most hazardous because it combines all of the hazards of the oil paint with the additional hazard that it is in a pressurized container which could explode if over heated or punctured. Signal word is *danger*.
- PAINT RIGHT (quart can): The oil-based paint is the next most hazardous. Oil paint contains petroleum distillates; the words volatile organic compound (VOC) may be found on the label. The vapors are harmful and may cause brain and central nervous system damage. Oil paint contains combustible vapors and liquid. Use only in an adequately ventilated area. Signal word is *warning.*
- GRECIAN URN Latex Paint (quart can): The latex, water-based paint in a non-pressurized can is the least hazardous, however it does contain crystalline silica which may cause eye and skin irritation. Latex paint is the best choice and is least hazardous. Signal word is *caution*.

Oven cleaner: Compare the signal words on the oven cleaners.

- CRUD-OFF Oven Cleaner (aerosol can): The oven cleaner in the aerosol can is the most hazardous because it contains corrosive material which can burn the skin or mucous membranes, and it is in a pressurized container that could explode if subjected to heat or puncture. Signal word is *danger*.
- EASY CLEAN Oven Cleaner (pump spray): The oven cleaner in the pump spray is less hazardous because it is not pressurized. Signal word is *caution.*

Hair spray: Compare the signal words on the hair spray products (if instructor was able to bring in a pump hair spray container) The hair spray itself is flammable.

- HOLD TIGHT (aerosol can): The aerosol can is the most hazardous because it contains flammable material in a pressurized container. Signal word is *warning* because it's flammable.
- Hair spray in a pump spray container: The pump spray bottle label will address the flammability of the contents only. The container is not an issue. Signal word is *warning* because it's flammable.

Enrichment Activity

- Make a display for school hallway display cases. Have students make their own posters illustrating the concepts. Check with your county or city solid waste staff for assistance in obtaining safe examples.
- Read the *How to reduce toxic chemicals in your home* brochure. Ask students to explore their own habits or homes and list where nontoxic practices could be incorporated.

Related Lesson Plans

📖 Lesson Plan 5: Read the Label: Signal Words
📖 Lesson Plan 6: Read the Label: Characteristic Words
📖 Lesson Plan 9: Proper Use
📖 Lesson Plan 11: Proper Storage
📖 Lesson Plan 12: Proper Disposal

Lesson Plan 9: Proper Use

Grade Level

Grades 4 to 6

Time needed

Prep: 20 minutes
Activity: 30 minutes

Materials & Props

- Display boards 6, 15, 16, and 18
- SIX GUN Garden Herbicide
- GO GET 'EM Fungicide
- SCUDS AWAY Flying Insect Killer

Vocabulary

See vocabulary list for definitions.
fungicide
herbicide
personal protective equipment (PPE)
pesticide
rodenticide
signal word
ventilation

Goal

Students will be able to identify the appropriate and safe use of various household hazardous products.

Objectives

Students will:

- Determine and direct a user where to find proper use instructions on three household hazardous products.
- Compare and assess which product to use in a given situation.
- Describe in two different scenarios the proper safety equipment to use when working with household hazardous products.

Information

- Read labels in their entirety to determine safe usage, proper personal protective equipment, directions for use, and storage guidelines.
- Always use the least hazardous product to do the job. Products with lower toxicity are safer for the user, safer for the environment, and less costly to dispose of unwanted products.
- Pesticide is a general term. There are different types of pesticides, each concentrating on a different type of pest.
    - Insecticide – insects
    - Herbicide – weeds
    - Fungicide – fungus and molds
    - Rodenticide – rodents

Activity

Using display boards 6, 15, 16, and 18, have the students complete the following questions.

1. Display board 15: *Which Product Should I Use?*
   - Look at the display board and determine the task to be completed.
   - What product should the woman use?
   - Read the label for proper usage, ventilation, and personal protective equipment (PPE).
2. Display board 16: *Can It Be Used Near Children and Pets?*
   - Look at the picture and determine what activity is taking place.
   - Is there anything wrong with this picture?
     Answer: The child is playing near used oil, gasoline, and antifreeze. The antifreeze tastes sweet to animals; the dog could drink the antifreeze, become sick, and may possibly die. The gasoline and oil are toxic if swallowed and are flammable.
3. Display board 18: *Can It Be Used Indoors? Do I Need Ventilation*?
   - Look at the picture and determine what activity is taking place.
   - What are some of the keys to keeping safe when using these products?
     1. Always use stains, strippers, and aerosols in well-ventilated areas. Often, basements are not ventilated very well.
     2. Keep the covers on stains and strippers to prevent evaporation and fumes from filling the work area.
     3. Keep absorbent rags and towels away from the products. Spontaneous combustion could occur.
   - Choose non-aerosol products.
   - Wear gloves, protective eyewear, and cover your clothes (PPE), display board 6.
4. Using the product sample prop below, review the usage directions on each pesticide: the signal words, the hazards associated with each product, and the storage and disposal guidelines. Determine which pesticide to use for the following problems and discuss alternative methods of pest and weed control:
   - Thistles in the garden: SIX GUN Garden Herbicide
   - Fungus on your apple trees: GO GET 'EM Fungicide
   - Flies and wasps: SCUDS AWAY Flying Insect Killer

Enrichment Activity

Ask the students to research and compile a list of nontoxic alternatives to the tasks on the display boards – by interviewing senior members of the community, using the Web, calling experts, or some other method.

Related Lesson Plans

📖 Lesson Plan 5: Read the Label: Signal Words
📖 Lesson Plan 6: Read the Label: Characteristic Words
📖 Lesson Plan 8: Read the Label: Think before Buying
📖 Lesson Plan 11: Proper Storage
📖 Lesson Plan 12: Proper Disposal

Lesson Plan 10: Don't Mix

Grade Level

Grades 4 to 6

Time needed

Prep: 30 minutes
Activity: 45 minutes

Materials & Props

- Display boards 6 and 17
- BLASTO Drain Opener
- SIX GUN Herbicide
- BE GONE Paint Stripper
- **From white-topped square pail:** three calibrated plastic containers, measuring spoons, water, vinegar, baking soda, and litmus paper.

Additional materials:

- Tyvek suit or apron, rubber gloves, and goggles

Vocabulary

See vocabulary list for definitions.

household hazardous product
ignitable
litmus paper
pH
reaction
toxic
vapor

Goal

Students will understand the dangers and consequences of mixing household hazardous products together.

Objectives

Students will:

- Describe two possible consequences if household hazardous products are mixed.
- Explain what pH means and how to test for it.
- List three precautions to take when using household hazardous products.

Information

- Acids and bases should not be mixed.
- Cola has a pH of 2.7 and is an acid.
- Baking soda has a pH of 8.4 and is a base (also known as an alkali).
- An extreme example of a reaction among household hazardous products is the bomb that was used to destroy the Federal Building in Oklahoma City in 1995.
- Household hazardous products cannot be put in a landfill unless the containers are empty, because the contents could potentially mix with other household hazardous waste and cause a reaction.
- An example of a toxic mixture would be mixing household bleach with ammonia or acids such as toilet bowl cleaners or rust removers.

Activity

1. Have the students look at display board 6 and describe the precautions taken to protect skin, eyes, and clothing from household hazardous products.
2. Have the students read the labels for BLASTO Drain Opener, SIX GUN Herbicide, and BE GONE Paint Stripper and answer the following questions:
   - What product(s) tell you how to protect yourself when using the products?
   - What product(s) give precautions about mixing the products with other materials?
3. Conduct this reaction experiment in front of the class:
   - Supplies in the white-topped square pail needed for the experiment: 3 calibrated plastic cups, measuring spoons, water, vinegar, baking soda, and litmus paper.
   - Other suggestions: Dress student in a Tyvek apron/suit, rubber gloves, and goggles. You can get these from your county HHW facility, county solid waste office, or school chemistry lab, or you may purchase them.

   a. Set up the three containers as follows and tear off three 1-inch strips of litmus paper.
      - Container 1 – mix together ½ cup vinegar and ½ cup water
      - Container 2 – 1 cup water
      - Container 3 – dissolve 1 tablespoon baking soda in 1 cup water

   b. Have the student dressed in the Tyvek apron/gloves/goggles check the pH of each cup by dipping a fresh 1-inch strip of litmus paper into each cup. Discuss observations with students.
      - Vinegar – litmus paper turns orange – pH range of 3 to 5, an acid
      - Water – litmus paper turns light green – pH 7, neutral
      - Baking soda – litmus paper turns dark green – pH 8 to 9, a base or alkali

   c. Have the student dressed in the Tyvek apron etc. pour Container 1 (vinegar) into Container 3 (baking soda). Discuss the results with the students. *Answer:* Container 3 foams up due to the chemical reaction between an acid and a base.
4. Have the students discuss the consequences of display board 17*: Do Not Mix Different Types of Products Together!*

Related Lesson Plans

📖 Lesson Plan 5: Read the Label: Signal Words
📖 Lesson Plan 6: Read the Label: Product Characteristics
📖 Lesson Plan 7: Read the Label: Emergency Information
📖 Lesson Plan 12: Proper Disposal

Lesson Plan 11: Proper Storage

Grade Level

Grades 4 to 6

Time Needed

Prep: 20 minutes
Activity 1: 45 minutes
Activity 2: 20 minutes

Materials & Props

- Display boards 1, 19, 20, 21, and 26
- Bifold display board 2a-2b – hinged home and garden
- All sample products

Additional materials:

- Notebook, pencil

Vocabulary

See vocabulary list for definitions.

compatible products
household hazardous waste (HHW)
incompatible products
label
poison control center
storage

Goal

Students will be able to determine the correct storage methods and locations for household hazardous products in their homes.

Objectives

Students will:

- Explain the need for correct storage of household hazardous products in the home.
- Name the proper storage locations for at least three different household hazardous products in the home.
- List three methods of correct storage of household hazardous products.

Information

- The average American home has 3 to 10 gallons of hazardous products (*Source:* Children's Health Environmental Coalition).
- More than 2.2 million poisonings were reported nationally to all U.S. poison control centers last year. Of these, 62% involved children under the age of 5.
- 13% of all poisonings that occur to young children happen in someone else's home, i.e. when visiting friends and relatives.
- Internal medicine (including adult vitamins with iron) is the #1 poisoning agent, followed by cleaning products, plants, cosmetics, and pesticides.
- Most poisonings are unintentional – they can be prevented.

Review from Lesson 7

- More than a million consumers call poison control centers each year about child poisonings.
- Poison control centers are staffed 24 hours a day, 7 days a week.
- Write the 1-800 telephone number for your poison control center from the inside cover of your phone book here:

  _____

Activity 1

Set up display boards 1, 19-21, and 26 and all product sample props before lesson begins. Ask students if they know where household hazardous products are stored in their homes. Discuss the locations brought up in class as to whether they may have positive or negative impacts on entire family. Break students into groups.

1. Ask each group to discuss where they would find information on where to properly store household hazardous products. Have students record their discussion. (*Answer:* Read the label. If storage information is not on the label, look at the signal and characteristic words to determine where best to store a product.)
2. Give each group a sample product prop. Have each student in turn read the label and write down the signal words, characteristic words, and the storage information for each product. If the label doesn't contain storage information, the group discusses appropriate storage locations for each product and why that location is suitable; the students record their discussion. Pass the prop on to next group. When all props have been reviewed by each group, a spokesperson for the group reports the group's findings to the class.
3. Instruct the groups to discuss why it is important to store products in their original containers with labels intact. *Answer:* It is important to leave a product in the original container with the label intact so that you know what the product is and how to use it properly. If original labels are gone, it may be difficult to determine what is in the container.
4. Ask students to name locations where household hazardous products could be properly stored.
    - Where are household hazardous products commonly stored? *Kitchen, bathroom, garage.*
    - Low vs. high cupboards? *High cupboard. Household hazardous products should always be kept out of reach of children.*
    - Locked vs. unlocked*? Locked cabinet.*
    - Will the product be ruined if it freezes? *Read the label.*
    - Should compatible and incompatible products be stored together? *Only compatible products.*

Conclusion. Through this activity, the students should understand the importance of and procedures for proper storage. Be sure to stress the following four summary points:

- Make sure lids and caps are tightly sealed.
- Store hazardous products carefully in a locked cabinet or on elevated shelf.
- Do not put hazardous materials into food containers or unlabeled containers.
- Keep out of reach of children.

Activity 2

Use the bifold display boards 2a-2b (home and garden display board) and miniature products and ask the students to find appropriate storage places for each miniature product.

Enrichment Activity

For students who want to further investigate, give them a copy of the Household Hazardous Products Survey. Ask the student to conduct a survey of their family members, friends, and neighbors as to where they store their household hazardous products, and the possible impact on the family, e.g. small children in household or pets. The students may present their findings to the class.

Related Lesson Plans

📖 Lesson Plan 1: What are household hazardous products and where do you find them?
📖 Lesson Plan 5: Read the Label: Signal Words

Lesson Plan 12: Proper Disposal

Grade Level

Grades 4 to 6

Time needed

Prep: 20 minutes
Activity 1: 30 minutes
Activity 2: 20 minutes

Materials & Props

- Display boards 22, 25, and 26, and bifold home and garden 2a-2b

Additional materials:

- HHW information sheets, brochures, or flyers from your local HHW facility, county solid waste office, or Office of Environmental Assistance

Vocabulary

See vocabulary list for definitions.

disposal
household hazardous waste (HHW)
household hazardous waste facility
label
storage
unlabeled

Goal

Students will know the necessity of and procedures for proper disposal of household hazardous products for the safety of humans and the environment.

Objectives

Students will:

- Describe three proper ways to dispose of household hazardous waste (HHW).
- Explain what to do with an unlabeled container with an unknown product inside.
- Identify the location of their local HHW facility and how to contact them.
- Discern what types of products are accepted at the HHW facility.

Information

- **What do you do with household hazardous products?**
  Use it up according to the label directions *unless* it is a product that is banned or restricted. Consider storing household hazardous products properly until the time comes when you can use it up or give it to someone else who can use it.
- **What do you do with household hazardous waste?**
  - Recycle it if possible (examples: car batteries, fluorescent bulbs).
  - Call your city or county solid waste authorities for information on HHW disposal. Ask whether there are collection events or if there is a HHW facility in the area.
  - Take it to a HHW facility or collection site. At a collection event or facility, trained personnel will accept the HHW, identify it, sort it, process it, and ship it to the proper location for safe disposal and/or recycling.
  - You should *not* pour household hazardous waste down the sink, down storm sewers, or on the ground. These are not proper disposal methods.
- **And remember,** the best way to dispose of HHW is not to make it in the first place. Be thoughtful about choosing safer, alternative products when purchasing materials that could become household hazardous waste.

Activity 1

Set up display boards 2a-2b, 22, and 26. Using display boards 22 and 26, have the students explore and discuss the following:

1. Discuss the disposal option of "using it up" (unless it is a product that is banned or restricted, or one that is very unsafe) and some of the household hazardous products that would be good to use up (paint, some cleaning products, etc.). *You can use up leftover usable paint on another painting project or give it to someone else who can use it up. Offer leftover paint to friends, neighbors, relatives, community theater groups, and community service organizations. Some household hazardous waste collection facilities have product exchange rooms where people can "shop" for useable products. There is no charge for these items.*
2. Which household hazardous wastes can be recycled? *Car batteries, motor oil, paint, and fluorescent bulbs. Motor oil can be collected and sealed in a container such as a plastic milk jug and taken to a local service station or other outlet where it is collected for recycling.*
3. Using display board 22, have the students discuss and answer these questions: "What do you do when you can't use it up or recycle it?" For example, what if the leftover paint froze and is no longer usable? What if the cleaning products are too old to use? What is the best way to dispose of HHW that will protect the environment?
4. What is a HHW facility?
5. Ask the students to locate the nearest HHW facility and determine its operating hours. In some cases, there may not be a facility nearby, but perhaps a collection event may be scheduled for this area.
6. Disposal information resources are helpful when the container has a label, but what should you do if you find an unknown substance in an unlabeled container? Review display board 26 to prevent using unlabeled containers. *Keep out of reach of children and set aside until you can take it to a HHW facility.*

Activity 2

1. Review the information sheets, brochures, or flyers from the HHW facility, county solid waste office, or Office of Environmental Assistance (OEA) that explains the types of products that are accepted at a HHW facility or collection event.
2. Play the Disposal Game, display board 25, using the information sheets from your local HHW facility, your county solid waste office, or the OEA as a guide. Have a member of the audience spin the spinner and tell the proper disposal of the HHW product under the spinner. Go through all the products on the spinner.

Related Lesson Plans

📖 Lesson Plan 5: Read the Label: Signal Words
📖 Lesson Plan 9: Proper Use
📖 Lesson Plan 11: Proper Storage

Lesson Plan 13: **Paint**

Grade Level

Grades 4 to 6

Time needed

Prep: 20 minutes
Activity: 45 minutes

Materials & Props

- PAINT RIGHT Oil Paint (quart can)
- PAINT RIGHT Oil Paint (aerosol)
- GRECIAN URN Latex Paint (quart can)

Additional materials:

- Tape measure
- Calculator

Vocabulary

See vocabulary list for definitions

aerosol
latex paint
oil paint
signal word
volatile organic compounds (VOC)

Goal

Students will understand the proper way to use, buy, and store paint safely.

Objectives

Students will:

- Calculate total square feet of a room.
- Determine the amount of paint required to paint a room. (There are four quarts in a gallon and one quart of paint covers 100 to 150 square feet.)
- Explain the best choice purchasing factors. (Review Lesson Plan 8.)
- Describe the proper storage and disposal methods for paint.

Information

- Review the labels on the PAINT RIGHT Oil Paint quart can, the PAINT RIGHT Oil Paint aerosol, and the GRECIAN URN Latex Paint quart can.
- **Latex paint** is a water-based product; easy clean-up with water. Do not freeze. Keep container closed so the paint does not dry out.
- **Oil-based paint** contains petroleum distillates. Vapor may be harmful; combustible vapors and liquid. Use in well-ventilated area. For clean-up, use mineral spirits in a well-ventilated area.
- **Oil paint and thinner** must never be poured down the drain.
- **Oil paint in aerosol cans** should be use only in well-ventilated areas; contents under pressure. Contains acetone and toluene.
- **A low VOC (volatile organic compounds) paint** is an alternative to more hazardous paints.
- Paint is the highest-volume material collected at Minnesota's HHW facilities. In 2001, HHW programs collected roughly 200,000 gallons of leftover latex paint and more than 150,000 gallons of leftover oil-based paint.

Activity

Paint is a very common household hazardous product. Use the following questions and discussion points to help the students understand its hazards and impacts.

1. How much paint is needed?
   a. Measure your classroom to determine how much paint is needed (height x width = total square feet).
   b. Calculate how many quarts or gallons are required to paint the room one time.
   c. If two coats of paint are needed, multiply your total by 2.
2. Ask the students to determine if latex paint or oil paint should be used for the painting job.
   - Latex paint is less toxic, however it does contain crystalline silica, which may cause eye and skin irritation. Signal word is *caution.*
   - Oil paint contains petroleum distillates. The vapors are harmful and may cause brain and central nervous system damage. Combustible vapors and liquid. Use only in well-ventilated area. Signal word is *warning*.

   Answer: Latex paint is a better choice because it is less hazardous to people and the environment.
3. Have the students determine if they should use aerosol oil paint or oil paint in a quart can. ***Choose the least hazardous product.***
   - The aerosol contains toluene and acetone and is also in a pressurized container. The quart can contains petroleum distillates. Both products require use in a well-ventilated area.
   - It is known how much space can be painted with a quart of oil-based paint, however it is not known how much space an aerosol will cover.

   Answer: The best choice is the quart can of paint, because the amount needed can be calculated from the label and the quart contains more product and thus covers more surface area than the aerosol. Because the quart can contains more product and covers more surface area, fewer cans of paint need to be purchased for the paint job.
4. Have the students discuss if they should purchase two quarts or one gallon of paint given this scenario: The paint store has a sale on paint. A gallon is cheaper than two quarts, however, you only need 1 ½ quarts. Should you purchase a gallon on sale or two quarts?
   - Buy the amount closest to the amount of paint required for the job.
   - If you intend to reuse the extra paint leftover in the gallon, purchase the gallon.
   - If you purchase the gallon, keep in mind storage guidelines. If the paint is latex, be sure to keep it from freezing. Store all paint products out of reach of children and away from heat and flame. Keep all containers tightly closed.
   - Leftover paint must be disposed of at a household hazardous waste collection or a product exchange program if the paint is still in good usable condition.

Related Lesson Plans

📖 Lesson Plan 3: Ground Water
📖 Lesson Plan 5: Read the Label: Signal Words
📖 Lesson Plan 8: Read the Label: Think before Buying
📖 Lesson Plan 11: Proper Storage
📖 Lesson Plan 12: Proper Disposal

Lesson Plan 14: Pesticides

Grade Level

Grades 4 to 6

Time needed

Prep: 15 minutes
Activity: 30 minutes

Materials & Props

- GO GET 'EM Fungicide
- SCUDS AWAY Flying Insect Killer
- SIX GUN Garden Herbicide

Vocabulary

See vocabulary list for definitions.
fungicide
herbicide
insecticide
pesticide
rodenticide

Goal

Students will know how to identify pesticides, their uses, proper safety, and storage.

Objectives

Students will:

- Define pesticide, herbicide, insecticide, fungicide, and rodenticide.
- Identify at least three types of pesticides and describe their uses.
- Classify three pesticides according to their signal words. (Review Lesson Plans 5 and 6.)
- Explain the proper handling and use of pesticides.
- Locate and state the proper disposal guidelines of at least two pesticides.
- Determine the first aid and emergency response if an incident were to occur when using pesticides.

Information

These common household products are pesticides:

- Insect repellents for personal use, such as mosquito repellent.
- Rat and other rodent poisons.
- Flea and tick sprays, powders, and pet collars.
- Kitchen, laundry, and bath disinfectants and sanitizers, including bleach.
- Toilet disinfectants.
- Products to kill mold and mildew.
- Lawn and garden products such as weed killers.
- Swimming pool chemicals, including those that kill algae.
- Repellents that keep deer, raccoons, or rabbits away from your garden.

Did you know?

- There are over 20,000 registered pesticides.
- One little brown bat is capable of eating 3,000 to 7,000 mosquitoes a night, but humans have killed off about 90% of the world's bat population in the last 20 to 30 years, mostly through the use of pesticides and the destruction of their natural habitats.

Activity

Introduce the background information to the students. Include the definition of pesticide and why it is important to read labels for correct use, signal words, and disposal. Review the following definitions with the students:

- pesticides
- signal words
- characteristic words
- safety
- storage
- disposal

Procedure

1. Using SCUDS AWAY Flying Insect Killer, GO GET 'EM Fungicide, and SIX GUN Garden Herbicide, divide the class into three groups, with one pesticide container per group. Have each group read the label on its container to find:
   - What does each pesticide target?
   - How is the pesticide stored?
   - How do you dispose of the pesticide?
   - What are the safety precautions for each pesticide?
2. Ask the students to discuss:
   - What pests does each pesticide target?
   - Which of the three examples is the most hazardous and why?
   - What is the best disposal option for these pesticides, according to their labels?
3. Ask the students to find out how and who to contact in their area for proper disposal of pesticides.

Enrichment Activity

Ask students to make a list of less toxic methods for getting rid of pests (insects, weeds, etc.) Have them discuss the advantages and disadvantages. For example, pulling dandelions instead of using a weed killer.

Related Lesson Plans

📖 Lesson Plan 5: Read the Label: Signal Words
📖 Lesson Plan 6: Read the Label: Characteristic Words
📖 Lesson Plan 7: Read the Label: Emergency Information
📖 Lesson Plan 9: Proper Use
📖 Lesson Plan 11: Proper Storage

Lesson Plan 15: Product Look-alikes

Grade Level

Grades 4 to 6

Time needed

Prep: 15 minutes
Activity: 30 to 45 minutes

Materials & Props

- Display board 26
- 12 product look-alike cards in the manila folder in blue-topped show-off container

Vocabulary

See vocabulary list for definitions.
edible
fatal
harmful
hazardous
inedible
look-alike products
poison control center

Goal

Students will be able to recognize the similarities and differences between household hazardous products and other products.

Objectives

Students will:

- Explain the importance of leaving household hazardous products in their original containers.
- State the importance of reading product labels.
- Give at least three possible consequences of improperly storing household hazardous products.

Information

- Keep the phone numbers of your local poison control center (1-800-222-1222 nationwide) and emergency medical service next to each phone. If you suspect someone has ingested poison, call a poison control center for instructions.
- Do NOT induce vomiting unless advised by the poison control center or physician, because this can often aggravate the poisoning or cause long-term damage.
- If a poisonous substance has contacted the skin or eyes, rinse the skin with running water for 15 minutes and remove any contaminated clothing. Irrigate eyes by holding the lids open and pouring cool water on the eyes for 15 minutes. Do not rub eyes or place the head directly under a faucet.

Poison facts

- More than 2.2 million poisonings were reported nationally to all U.S. poison control centers last year.
- 62% of all poisonings involve children under the age of 5.
- 13% of all poisonings that occur to young children happen in someone else's home, i.e. when visiting friends and relatives.
- Internal medicine (including adult vitamins with iron) is the #1 poisoning agent, followed by cleaning products, plants, cosmetics, and pesticides.
- Most poisonings are unintentional – they can be prevented.

Activity

This activity uses the product look-alike cards and display board 26 and is designed to help the students understand that although an item may look safe, it may not be. The product may be harmful or fatal if swallowed. If they see something that they are unsure about or if they see a small child ingest something they are unsure about, they should tell an adult.

Remind students about proper labeling and storage of household hazardous products:

- Make sure lids and caps are tightly sealed, and the labels are secure.
- Store hazardous products carefully in a locked cabinet or on an elevated shelf.
- Do not put hazardous materials into food containers or unlabeled containers.
- Keep out of reach of children.

Procedure

1. Tape the 12 product look-alike cards to the front chalkboard.
2. Ask the individual students to look at the pictures and write down what they think the products are.
3. Have five volunteers each select two product cards that look alike and place the matching pairs on the board.
4. Have the class vote to agree or disagree on the pairs made.
5. As you point to each pair, ask them to decide which are the household hazardous products and which ones are the look-alikes.
6. Ask the students to discuss what the point of the activity was and what should they learn from it.
7. If time allows, have the students share stories about mistakes people have made with household hazardous products and look-alikes.

Related Lesson Plans

- 🕮 Lesson Plan 1: What are household hazardous products and where do you find them?
- 🕮 Lesson Plan 4: Exposure Pathways
- 🕮 Lesson Plan 5: Read the Label: Signal Words
- 🕮 Lesson Plan 6: Read the Label: Product Characteristics
- 🕮 Lesson Plan 7: Read the Label: Emergency Information

Household Hazardous Products Survey

Category of hazardous waste	Number of items	List signal words	Hazardous? Yes/No	Stored safely? Yes/No
Paints and solvents				
Living room				
Furniture polish				
Spot remover				
Bathroom				
Nail polish/remover				
Workbench				
Paint				
Varnish				
Paint thinner				
Furniture stripper				
Total # of paints and solvents				
Household cleaners				
Kitchen/bathroom				
Drain cleaner				
Oven cleaner				
Floor cleaner				
Disinfectant				
Ammonia				
Laundry room				
Bleach				
Total # of household cleaners				
Pesticides				
Lawn				
Weed killers				
Insecticides				
Bug repellent				
Flea spray/collars				
Total # of pesticides				
Automotive products				
Garage				
Car wax				
Motor oil				
Gasoline				
Kerosene				
Antifreeze				
Total # of automotive products				
Around the house				
Aerosol sprays				
Household batteries				
Button batteries				
Pool chemicals				
Other				
Total # of misc. products				
Total # of hazardous products				

Reference sheet for determining hazardous materials and proper storage

Determining if a product is hazardous

A product is hazardous if the label contains a signal word, which is required by federal law.

Signal word	Level of hazard	
No signal word	Product is not hazardous	Least hazardous
Caution	Mildly to moderately hazardous	
Warning	Moderately hazardous	
Danger	Extremely hazardous: extremely flammable, corrosive, or highly toxic	Most hazardous
Poison	Toxic/highly toxic	

A product is hazardous if it has one of the following properties:

Flammable/combustible
Explosive/reactive
Corrosive: acidic or basic
Toxic

Guidelines for storing products safely

- Keep products out of reach of children and animals.
- Store all hazardous products on high shelves or in locked cabinets away from food items.
- Make sure the lids and caps are tightly sealed and child proofed.
- Store corrosive, flammable, reactive, and poisonous products on separate shelves and where will stay dry.
- Store products that say prevent freezing indoors.
- Keep products in their original containers and make sure the labels are clearly legible.
- For long-term storage, place waterproof transparent tape over the product labels to prevent them from falling off.
- Keep products away from heat, sparks, flames, or sources of ignition.
- Never mix chemicals together to save storage space.
- Keep an inventory of the products you have so you do not buy more than you need.

Vocabulary List

Absorption	When chemicals get into your bloodstream by going through your skin. Absorption is one of the four exposure pathways.
Aerosol	A suspension of fine solid or liquid particles in gas which is dispensed from an aerosol container.
Aerosol container	A metal can that holds material under pressure. When the nozzle is depressed, the material is propelled out the nozzle.
Aquifer	Any geologic formation capable of holding water; aquifers can be soil or rock formations. We get our drinking water from ground water aquifers under the ground.
Bioaccumulate	Certain toxins accumulate in the tissues of animals, which are then carried up the food chain. Mercury is a bio-accumulative toxin. Humans may be poisoned by mercury when fish consumption advisories are not followed.
Caution	One of the four signal words. Products labeled with this signal word are mildly to moderately hazardous. They pose less of a hazard than products with *warning, danger*, or *poison*
Characteristic word	Indicates the type of hazard posed by a product (as opposed to the level of hazard as indicated by the product's signal word) and is found on the label. The most common characteristic words are *flammable, combustible, corrosive, toxic,* and *reactive*.
Combustible	A characteristic word that means that the product can catch fire and support a flame. A product labeled *combustible* is slightly less hazardous than one labeled *flammable.*
Compatible	Compatible chemicals are those which can be stored together without any potential adverse reaction occurring (e.g., explosions).
Condensation	The liquid (rain) or solid (snow, ice, hail) form of water that is stored in clouds.
Contact	When chemicals get into your bloodstream just by touching them. Can cause burning, itching, and redness if it gets on skin or in eyes, nose, or throat. Contact is one of the four exposure pathways.
Contaminate	Something that pollutes.
Corrosive	Can cause burns. Corrosive is one of the characteristic words.

Danger	One of the four signal words. Products that have this signal word on the label are extremely flammable, corrosive, or highly toxic. They pose the greatest hazard (higher hazard than *caution* or *warning).*
Disposal	Any action that introduces waste into the environment.
Edible	Fit to eat.
Environment	Air, water, and land.
Evaporation	When the liquid or solid form of water turns into the vapor (gas) form of water by being heated by the sun.
Exposure pathways	The different ways that chemicals can enter the body. The major exposure pathways are inhalation, ingestion, contact, and absorption.
Fatal	Causing or capable of causing death.
Flammable	A characteristic word that means that the product can easily catch fire and support a flame. A product labeled *flammable* is more hazardous than one labeled *combustible.*
Food chain	Organisms in an ecological community where larger organisms prey upon smaller organisms for their food source.
Fungicide	A chemical used to kill fungi, including mold. It is a type of pesticide.
Ground water	Water that has seeped through many layers of soil and is stored in rock, gravel, and sand layers.
Harmful	Can cause injury.
Hazardous	In the simplest terms, *hazardous* means that it can cause injury or illness. Technically, this term has a very specific definition as it applies to business waste.
Herbicide	A chemical used to kill weeds and unwanted grasses. It is a type of pesticide.
Household hazardous product	Any product that can present a higher health or environmental threat when used, stored, or thrown away improperly. When a household hazardous product is no longer usable or wanted, it becomes a household hazardous waste.
Household hazardous waste (HHW)	A household hazardous product that is no longer usable or wanted.

Household hazardous waste facility	A place where citizens can take their household hazardous waste for proper disposal. A household hazardous waste facility is usually operated by the county in which it is located.
Ignitable	Capable of causing a fire.
Incompatible	Incompatible chemicals are those which cannot be stored together due to any potential adverse reaction occurring (e.g., explosions).
Inedible	Not suitable as food.
Ingestion	When chemicals enter your bloodstream by first getting into your stomach by eating or drinking. Ingestion is one of the four exposure pathways.
Inhalation	When chemicals enter your bloodstream by first getting into your lungs by breathing vapors through your nose and mouth. Inhalation is one of the four exposure pathways.
Insecticide	A chemical used to kill insects. It is a type of pesticide.
Label	The information put onto a product that describes the product's intended use, instructions for proper use, contents, safety instructions, and sometimes disposal instructions.
Landfill	A designed structure in which trash is isolated from the surrounding environment (ground water, rain, the atmosphere). The landfill has a liner to protect the ground water, and the trash is covered daily.
Leachate	Water moves through soil and removes nutrients or harmful chemicals to form leachate.
Litmus paper	Paper that is used to test whether a product is acidic (pH of under 7) or alkaline (pH of over 7). Acids turn blue litmus paper red, and alkaline solutions turn red litmus paper blue.
Look-alike products	Household products with the potential to cause harm that look like harmless products (for example, motor oil and syrup).
Nonpoint source pollution	If the pollution source cannot be identified and is often carried by wind or water, it is called nonpoint source pollution.
Open dump	A place where trash is illegally dumped. In open dumps, HHW liquids can mix to cause potential reactions and can leach into the ground water. Open dumps attract mice and rats.

pH	A scale from 0 to 14 that measures how acidic or alkaline a solution is. Acids typically have a pH (stands for *potential of hydrogen*) of 1 to 4; akalines typically have a pH of 10 to 14; and neutral substances typically have a pH of 5 to 9.
Personal protective equipment (PPE)	Includes clothing, gloves, eye protection, and boots that one wears to protect oneself when working with chemicals.
Pesticide	A general term for herbicides, insecticides, and fungicides.
Petroleum distillates	Petroleum distillates include products like fuel oil, kerosene, gasoline, and turpentine. It may also include products that are a mixture of one or more of these.
Point source pollution	A single identifiable source of pollution. For example, household hazardous waste dumped into a storm sewer is called point source pollution.
Poison	One of the four signal words. Products that have this signal word on the label are extremely toxic. They pose the greatest hazard (higher hazard than *caution* or *warning).*
Poison control center	Call centers that may be provided by state for information on what to do in accidental poisonings.
Reaction	A change in the chemical properties of two substances when mixed. A reaction could result in a new substance being formed.
Rodenticide	A chemical used to kill rodents. This is a type of pesticide.
Septage	Includes wastes from toilets, showers, kitchen sinks, etc. These wastes either go to a septic tank system or a wastewater treatment facility.
Signal words	Words on a product's label which indicate the product's degree of hazard – how toxic or hazardous a product can be. The four signal words are *caution*, *warning, danger,* and *poison.*
Spontaneous combustion	When a fire may start without a spark being introduced. For example, rags contaminated with certain solvents may spontaneously combust (start on fire) due to a chemical reaction.
Storage	The method by which one keeps household products for future use or disposal.
Storm drain	Storm drains are the grates at the sides or curbs of streets. They are designed to collect rainwater to prevent street flooding. Storm drains discharge directly to wetland, streams, or lakes.

Surface water	Water that is on the surface of land, such as lakes, rivers, streams, and oceans.
Toxic	Harmful to health. Toxic can pertain to any living being.
Vapor	A gas.
Volatile	Can evaporate readily at normal temperatures.
Volatile organic compound (VOC)	These compounds are commonly found in paints and solvents. Some may react in the upper atmosphere and deplete the ozone layer.
Warning	One of the four signal words. Products that have this signal word on the label are moderately hazardous. They pose less of a hazard than products with *danger* or *poison*.
Water cycle	The cycle of water moving continuously in the environment in an ongoing process. Water in the atmosphere comes from evaporation from surface water. Rain replenishes the ground water, which can then resupply streams and lakes.
Wastewater treatment plant	A plant where wastewater from households and businesses is treated and then discharged into a body of water.
Water vapor	The gas form of water.

Web Resources

Office of Environmental Assistance

The Minnesota Pollution Control Agency has numerous resources on household hazardous products on its web site at http://www.pca.state.mn.us/waste/hhw.html. These resources will soon be transferred to the OEA web site at http://www.moea.state.mn.us.

The Office of Environmental Assistance offers a variety of waste reduction tips and nontoxic alternatives on its web site at http://www.moea.state.mn.us/index.html.

SEEK (www.seek.state.mn.us/) is Minnesota's interactive directory of resources for environmental education. The SEEK directory works as a clearinghouse for all types of environmental education resources, including articles, lesson plans, and displays.

Environmental Protection Agency

EPA Environmental Education Center: http://www.epa.gov/teachers/

Planet Protectors Club: http://www.epa.gov/epaoswer/osw/kids/index.htm

Minnesota Department of Natural Resources

DNR's education page: http://www.dnr.state.mn.us/education/index.html

Project WET: http://www.dnr.state.mn.us/projectwet/index.html

Project WILD: http://www.dnr.state.mn.us/projectwild/index.html

Project Learning Tree: http://www.dnr.state.mn.us/plt/index.html

Additional Information

For further information about household hazardous products, visit the following web sites:

Board of Soil and Water Resources: www.bwsr.state.mn.us/outreach/education/index.html

Minnesota Department of Health: www.health.state.mn.us

Children's Health Environmental Coalition: Healthehouse (CHEC's interactive resource for information on how to reduce environmental health risks to children in and around the home): http://www.checnet.org/healthehouse/index.asp